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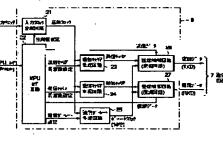
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(54) READER WRITER AND COMMUNICATION CONDITION SETTING METHOD FOR THE SAME



(57)Abstrac

PROBLEM TO BE SOLVED: To give versatility corresponding to various communication conditions and to improve developing efficiency and maintenance efficiency.

SOLUTION: When power is supplied, an MPU

SOLUTION: When power is supplied, an MPU I/F circuit 22 decides an initial communication mode as a communication protocol with MPU 5, receives communication condition information from MPU 5 through serial communication, and decodes received communication condition information. Then, it sets the frequency dividing value of an input clock frequency dividing circuit 21 based on the decoded communication condition, sets the

transmission carrier frequency of a transmission carrier generation circuit 23, sets the reception carrier frequency of a reception carrier generation circuit 24, sets the communication baud rate of a communication baud rate generation circuit 25, receives information of the other modes from MPU 5 through serial communication, sets the other modes, validates whole setting and starts communication with a radio card.

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CLAIMS

[Claim(s)]

means, A communication link baud rate generation means to generate a carrier generation means to generate a transmitting carrier by the reference clock communication link baud rate clock value A dividing means to carry out dividing of the carrier frequency, Receive the information on a communication link baud rate clock above-mentioned controlling element, a transmitted carrier frequency, a received above-mentioned dividing means, The reference clock value determined by the communication link baud rate clock by the reference clock generated with the receiving carrier by the reference clock generated with the above-mentioned dividing generated with this dividing means, A receiving carrier generation means to generate a clock inputted from the outside, and to generate a reference clock, A transmitting clock value, a transmitted carrier frequency, a received carrier frequency, and a receiving carrier generation means as the above-mentioned receiving carrier to have set the received carrier frequency generated with the above-mentioned carrier generation means. The reader writer carry out having provided a setting means transmitting carrier generation means is set as the above-mentioned transmitting means. The transmitted carrier frequency generated with the above-mentioned means based on this received information is set as the above-mentioned dividing value, and the reference clock value generated with the above-mentioned dividing Claim 1] In a reader writer with the controlling element which determines a reference

A transmitting carrier generation means to generate a transmitting carrier by the means. The reader writer characterized by providing a setting means to set the carrier frequency is set as the above-mentioned transmitting carrier generation dividing means. The dividing value which generates the above-mentioned transmitted communication link baud rate clock value, decodes this received serial data, and carrier frequency, The dividing value which receives the serial data of a clock generated with the above-mentioned dividing means, and to generate a communication link baud rate generation means to carry out dividing of the reference generation means to carry out dividing of the reference clock generated with the this dividing means, and to generate a transmitting carrier, A receiving carrier clock inputted from the outside, and to generate a reference clock, A transmitting communication link baud rate clock value A dividing means to carry out dividing of the with the above-mentioned dividing means, A reference clock value, a transmitted to generate a communication link baud rate clock by the reference clock generated above-mentioned dividing means, A communication link baud rate generation means reference clock generated with this dividing means, A receiving carrier generation out dividing of the clock inputted from the outside, and to generate a reference clock information, and determines communication link conditions A dividing means to carry the above-mentioned communication link baud rate generation means. the above-mentioned receiving carrier generation means, and to set the dividing value dividing value which generates the above-mentioned received carrier frequency as generates the above-mentioned reference clock value is set as the above-mentioned above-mentioned controlling element, a transmitted carrier frequency, a received communication link baud rate clock, The reference clock value determined by the above-mentioned dividing means, and to generate a receiving carrier, A carrier generation means to carry out dividing of the reference clock generated with clock value, a transmitted carrier frequency, a received carrier frequency, and a above-mentioned communication link baud rate generation means as the description carrier frequency, a received carrier frequency, and a storage means by which two or means to generate a receiving carrier by the reference clock generated with the identification information given to two or more communication link condition [Claim 3] In a reader writer with the controlling element which specifies the which generates the above-mentioned communication link baud rate clock value as [Claim 2] In a reader writer with the controlling element which determines a reference with the above-mentioned communication link baud rate generation means as the generation means, and to set the communication link baud rate clock value generated

transmitted carrier frequency generated with the above-mentioned transmitting element, and the above-mentioned storage means is searched using this identification storage means by which two or more communication link conditions that identification clock value, a transmitted carrier frequency, a received carrier frequency, and a dividing means, and to generate a communication link baud rate clock, A reference carry out dividing of the reference clock generated with this dividing means, and to outside, and to generate a reference clock, A transmitting carrier generation means to generation means, and to set the communication link baud rate clock value generated generation means. The reader writer carry out having provided a setting means to information retrieved and called is set as the above-mentioned dividing means. The rate clock value is memorized beforehand, Receive the identification information information that received. The dividing value which generates the reference clock communication link conditions determined by the above-mentioned controlling dividing value which generates a communication link baud rate clock value are to carry out dividing of the reference clock generated with the above-mentioned and to generate a receiving carrier, A communication link baud rate generation means dividing of the reference clock generated with the above-mentioned dividing means, information A dividing means to carry out dividing of the clock inputted from the identification information given to two or more communication link condition [Claim 4] In a reader writer with the controlling element which determines the above-mentioned communication link baud rate generation means as the description. with the above-mentioned communication link baud rate generation means as the receiving carrier generation means as the above-mentioned receiving carrier have set the received carrier frequency generated with the above-mentioned carrier generation means is set as the above-mentioned transmitting carrier generated with the above-mentioned dividing means as communication link condition searched using this identification information that received. The reference clock value above-mentioned controlling element, and the above-mentioned storage means is which specifies the communication link conditions determined by the given to communication link condition information including a communication link baud more communication link condition information that identification information was above-mentioned dividing means. The dividing value which generates a transmitted value as communication link condition information retrieved and called is set as the memorized beforehand, Receive the identification information which specifies the information was given to communication link condition information including the generate a transmitting carrier, A receiving carrier generation means to carry out

carrier frequency is set as the above-mentioned transmitting carrier generation means. The reader writer characterized by providing a setting means to set the dividing value which generates a received carrier frequency as the above-mentioned receiving carrier generation means, and to set the dividing value which generates a communication link baud rate clock value as the above-mentioned communication link baud rate clock value as the above-mentioned communication link

the above-mentioned dividing means. The transmitted carrier frequency generated with the above-mentioned dividing means based on this received information is set as reference clock generated with the above-mentioned dividing means, The reference rate generation means to generate a communication link baud rate clock by the clock generated with the above-mentioned dividing means, A communication link baud transmitting carrier by the reference clock generated with this dividing means, A to generate a reference clock, A transmitting carrier generation means to generate a radio A dividing means to carry out dividing of the clock inputted from the outside, and and a communication link baud rate clock value, and performs a wireless card and transmitted from the above-mentioned controlling element, The receiving carrier transmission-control means to generate modulation data from the transmit data set up with this setting means, The communication link baud rate clock generated with above-mentioned communication link baud rate generation means, The transmitting above-mentioned communication link baud rate generation means as the set the communication link baud rate clock value generated with the generation means as the above-mentioned receiving carrier generation means, and to received carrier frequency generated with the above-mentioned receiving carrier above-mentioned transmitting carrier generation means. A setting means to set the with the above-mentioned transmitting carrier generation means is set as the communication link baud rate clock value, and the reference clock value generated carrier frequency, a received carrier frequency, Receive the information on a clock value determined by the above-mentioned controlling element, a transmitted receiving carrier generation means to generate a receiving carrier by the reference reference clock value, a transmitted carrier frequency, a received carrier frequency [Claim 5] In the reader writer which has the controlling element which determines a generated with the above-mentioned receiving carrier generation means set up with the above-mentioned communication link baud rate generation means, and a carrier generated with the above-mentioned transmitting carrier generation means data from the received data received from the communication link baud rate clock he above-mentioned setting means, A reception-control means to generate recovery.

generated with the above-mentioned communication link baud rate generation means and the above-mentioned wireless card. The reader writer characterized by providing the control means which controls data processing to the above-mentioned transmit data to the above-mentioned transmission-control means, and controls data processing to the above-mentioned recovery data to the above-mentioned reception-control means.

approach of the reader writer characterized by becoming. value which carries out generation -- since -- the communication link conditioning generation, and sets up the above-mentioned communication link baud rate clock generation, sets up the above-mentioned received carrier frequency which carries out sets up the above-mentioned transmitted carrier frequency which carries out carries out generation is set up based on this received information, the step which link baud rate clock value, and the above-mentioned reference clock value which frequency, a received carrier frequency, Receive the information on a communication determined by the above-mentioned controlling element, a transmitted carrier baud rate clock by the above-mentioned reference clock, The reference clock value above-mentioned reference clock. The step which generates a communication link reference clock, and the step which generates a receiving carrier by the generates a reference clock. The step which generates a transmitting carrier by this value. The step which carries out dividing of the clock inputted from the outside, and frequency, a received carrier frequency, and a communication link baud rate clock controlling element which determines a reference clock value, a transmitted carrier [Claim 7] It is the communication link conditioning approach of a reader writer with th and a reader writer according to claim 5 characterized by being such combination. operation data, addition and deletion of a frame start / frame termination character addition and deletion of synchronous character data, addition and deletion of CRC [Claim 6] Data processing controlled by the above-mentioned control means is

[Claim 8] It is the communication link conditioning approach of a reader writer with the controlling element which determines a reference clock value, a transmitted carrier frequency, a received carrier frequency, and a communication link baud rate clock value. The step which carries out dividing of the clock inputted from the outside, and generates a reference clock, The step which carries out dividing of this reference clock, and generates a transmitting carrier, and the step which carries out dividing of the above-mentioned reference clock, and generates a receiving carrier. The step which carries out dividing of the above-mentioned reference clock, and generates a communication link baud rate clock. The reference clock value determined by the

above-mentioned controlling element, a transmitted carrier frequency, a received carrier frequency, The dividing value which receives the serial data of a communication link baud rate clock value, decodes this received Syria ** data, and generates the above-mentioned reference clock value is set up. the step which sets up the dividing value which generates the above-mentioned transmitted carrier frequency, sets up the dividing value which generates the above-mentioned received carrier frequency, and sets up the dividing value which generates the above-mentioned communication link baud rate clock value -- since -- the communication link conditioning approach of the reader writer characterized by becoming.

communication link condition information, and which carries out generation, set up the determined by the above-mentioned controlling element, search the identification step which memorizes beforehand two or more communication link condition communication link baud rate clock by the above-mentioned reference clock, The carrier by the above-mentioned reference clock, The step which generates a specifies the identification information given to two or more communication link writer characterized by becoming. generation, since -- the communication link conditioning approach of the reader up the above-mentioned communication link baud rate clock value which carries out the above-mentioned received carrier frequency which carries out generation, and set above-mentioned transmitted carrier frequency which carries out generation, set up step set up the above-mentioned reference clock value which is included in this information which is carrying out [above-mentioned] storage using this identification the identification information which specifies the communication link conditions received carrier frequency, and a communication link baud rate clock value, Receive information including a reference clock value, a transmitted carrier frequency, a information that identification information was given to communication link condition transmitting carrier by this reference clock, and the step which generates a receiving from the outside, and generates a reference clock. The step which generates a condition information, and determines communication link conditions, and is inputted link conditioning approach of a reader writer with the controlling element which [Claim 9] The step which carries out dividing of the clock which is the communication information that received, and communication link condition information is called. The

[Claim 10] The step which carries out dividing of the clock which is the communication link conditioning approach of a reader writer with the controlling element which determines the identification information given to two or more

baud rate clock value -- since -- the communication link conditioning approach of the transmitted carrier frequency, sets up the dividing value which generates a received connoisseur --- the step which sets up the dividing value which generates a which generates the reference clock value included in principle ***** is set up. this carrying out [above-mentioned] storage using this identification information that above-mentioned controlling element, search the identification information which is which specifies the communication link conditions determined by the and a communication link baud rate clock value, Receive the identification information a reference clock value, a transmitted carrier frequency, a received carrier frequency communication link condition information including the dividing value which generates more communication link conditions that identification information was given to communication link baud rate clock, The step which memorizes beforehand two or which carries out dividing of the above-mentioned reference clock, and generates a the above-mentioned reference clock, and generates a receiving carrier, The step clock, and generates a transmitting carrier, and the step which carries out dividing of generates a reference clock. The step which carries out dividing of this reference carrier frequency, and sets up the dividing value which generates a communication link received, and communication link condition information is called. The dividing value communication link condition information, and is inputted from the outside, and reader writer characterized by becoming

step which generates a receiving carrier by the above-mentioned reference clock clock. The step which generates a transmitting carrier by this reference clock, and the baud rate clock value. The step which carries out dividing of the clock which is the sets up the above-mentioned communication link baud rate clock value which carries the above-mentioned received carrier frequency which carries out generation, and set up based on this received information. The step which sets up the value, and the above-mentioned reference clock value which carries out generation is carrier frequency, Receive the information on a communication link baud rate clock above-mentioned controlling element, a transmitted carrier frequency, a received The step which generates a communication link baud rate clock by the wireless card and radio, and is inputted from the outside, and generates a reference communication link conditioning approach of the reader writer which performs a transmitted carrier frequency, a received carrier frequency, and a communication link [Claim 11] It has the controlling element which determines a reference clock value, a above-mentioned transmitted carrier frequency which carries out generation, sets up above-mentioned reference clock, The reference clock value determined by the

out generation, The transmitting carrier generated by the transmitted carrier frequency by which a setup was carried out [above-mentioned], the communication link baud rate clock generated with the communication link baud rate clock value by which a setup was carried out [above-mentioned]. The step which generates modulation data from the transmit data transmitted from the above-mentioned controlling element. The step which generates recovery data from the received data received from the receiving carrier generated by the received carrier frequency by which a setup was carried out [above-mentioned], the communication link baud rate clock generated with the above-mentioned communication link baud rate clock generated with the above-mentioned wireless card, the step which controls data processing to the above-mentioned transmit data, and controls data processing to the above-mentioned recovery data — since — the communication link conditioning approach of the reader writer characterized by becoming.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[Field of the Invention] This invention exchanges data between high order equipment and a wireless card, and relates to the communication link conditioning approach of a reader writer and a reader writer which consists of an interface with these, and MPU which controls the whole.

[Description of the Prior Art] Conventionally, the wireless card processing system for wireless cards consists of a host (high order equipment, PC), a reader writer (R/W),

and a wireless card. The above-mentioned reader writer connects a host (PC) and a wireless card. This reader writer is constituted by the interface and transceiver circuit which consist of MPU and LSI which control the whole.

[0003] The wireless (IC) card is operating on various communication link conditions by the class each. The reader writer for performing the communication link with these wireless card until now was manufacturing respectively the thing with the communicate mode corresponding to the communication link conditions of a wireless card. Therefore, it is necessary to prepare the reader writer B' for a wireless card with the communication link conditions [writer / A' / reader] B at a wireless card with the communication link conditions A.

[0004] The communication link conditions said here are a "received carrier frequency", a "transmitted carrier frequency", and a "transceiver communication link baud rate."

[0005] However, making a reader writer according to the communication link conditions of each wireless card has very bad development effectiveness. Moreover, although making a reader writer with other completely equivalent functions only from only communication link conditions differing by the class of a wireless card did not have a problem technically, the effort serious in development effectiveness and a maintenance side occurred, and there was a problem that effectiveness worsened. [0006]

[Problem(s) to be Solved by the Invention] Although making a reader writer according to the communication link conditions of each wireless card had very bad development effectiveness and it did not have a problem technically that only communication link conditions only differ and other functions completely make an equivalent reader writer by the class of a wireless card as described above, the effort serious in development effectiveness and a maintenance side occurred, and there was a problem that effectiveness worsened.

[0007] Then, this invention gives the versatility corresponding to various communication link conditions, and aims at offering the communication link conditioning approach of a reader writer and a reader writer which can raise development effectiveness and the effectiveness of a maintenance.

[Means for Solving the Problem] In a reader writer with the controlling element as which the reader writer of this invention determines a reference clock value, a transmitted carrier frequency, a received carrier frequency, and a communication link baud rate clock value A dividing means to carry out dividing of the clock inputted from

carrier, A receiving carrier generation means to carry out dividing of the reference setting means to set the received carrier frequency generated with the baud rate clock by the reference clock generated with the above-mentioned dividing and generates the above-mentioned reference clock value is set as the receiving carrier, A communication link baud rate generation means to carry out clock generated with the above-mentioned dividing means, and to generate a reference clock generated with this dividing means, and to generate a transmitting means to carry out dividing of the clock inputted from the outside, and to generate a received carrier frequency, and a communication link baud rate clock value A dividing this invention determines a reference clock value, a transmitted carrier frequency, a value generated with the above-mentioned communication link baud rate generation is set as the above-mentioned transmitting carrier generation means. It consists of frequency generated with the above-mentioned transmitting carrier generation means information is set as the above-mentioned dividing means. The transmitted carrier value generated with the above-mentioned dividing means based on this received element, a transmitted carrier frequency, a received carrier frequency, Receive the communication link baud rate generation means to generate a communication link the reference clock generated with the above-mentioned dividing means, A dividing means, A receiving carrier generation means to generate a receiving carrier by transmitting carrier generation means. It consists of setting means to set the dividing above-mentioned transmitted carrier frequency is set as the above-mentioned above-mentioned dividing means. The dividing value which generates the data of a communication link baud rate clock value, decodes this received serial data, frequency, a received carrier frequency, The dividing value which receives the serial determined by the above-mentioned controlling element, a transmitted carrier and to generate a communication link baud rate clock, The reference clock value dividing of the reference clock generated with the above-mentioned dividing means, reference clock, A transmitting carrier generation means to carry out dividing of the [0009] In a reader writer with the controlling element as which the reader writer of means as the above-mentioned communication link baud rate generation means. receiving carrier generation means, and to set the communication link baud rate clock above-mentioned receiving carrier generation means as the above-mentioned information on a communication link baud rate clock value, and the reference clock means, The reference clock value determined by the above-mentioned controlling means to generate a transmitting carrier by the reference clock generated with this the outside, and to generate a reference clock, A transmitting carrier generation transmitting carrier generation means to carry out dividing of the reference clock dividing of the clock inputted from the outside, and to generate a reference clock, A and to set the communication link baud rate clock value generated with the carrier generation means as the above-mentioned receiving carrier generation means to set the received carrier frequency generated with the above-mentioned receiving above-mentioned transmitting carrier generation means. It consists of setting means the above-mentioned transmitting carrier generation means is set as the communication link condition information retrieved and called is set as the storage means is searched using this identification information that received. The generation means to generate a receiving carrier by the reference clock generated carrier by the reference clock generated with this dividing means. A receiving carrier link condition information, and determines communication link conditions A dividing or more communication link condition information A dividing means to carry out identification information by which the reader writer of this invention was given to two above-mentioned communication link baud rate generation means. above-mentioned communication link baud rate generation means as the above-mentioned dividing means. The transmitted carrier frequency generated with reference clock value generated with the above-mentioned dividing means as determined by the above-mentioned controlling element, and the above-mentioned identification information which specifies the communication link conditions communication link baud rate clock value is memorized beforehand, Receive the information was given to communication link condition information including a which two or more communication link condition information that identification transmitted carrier frequency, a received carrier frequency, and a storage means by generated with the above-mentioned dividing means, A reference clock value, a means to generate a communication link baud rate clock by the reference clock with the above-mentioned dividing means, A communication link baud rate generation reference clock. A transmitting carrier generation means to generate a transmitting means to carry out dividing of the clock inputted from the outside, and to generate a invention specifies the identification information given to two or more communication the above-mentioned communication link baud rate generation means. which generates the above-mentioned communication link baud rate clock value as above-mentioned receiving carrier generation means, and to set the dividing value value which generates the above-mentioned received carrier frequency as the [0011] In a reader writer with the controlling element which determines the [0010] In a reader writer with the controlling element which the reader writer of this

> communication link baud rate generation means. which generates a communication link baud rate clock value as the above-mentioned above-mentioned receiving carrier generation means, and to set the dividing value means to set the dividing value which generates a received carrier frequency as the the above-mentioned transmitting carrier generation means. It consists of setting means. The dividing value which generates a transmitted carrier frequency is set as condition information retrieved and called is set as the above-mentioned dividing dividing value which generates the reference clock value as communication link storage means is searched using this identification information that received. The determined by the above-mentioned controlling element, and the above-mentioned a communication link baud rate clock value are memorized beforehand, Receive the communication link condition information including the dividing value which generates communication link conditions that identification information was given to frequency, a received carrier frequency, and a storage means by which two or more communication link baud rate clock, A reference clock value, a transmitted carrier clock generated with the above-mentioned dividing means, and to generate a the above-mentioned dividing means, and to generate a receiving carrier, A carrier generation means to carry out dividing of the reference clock generated with identification information which specifies the communication link conditions communication link baud rate generation means to carry out dividing of the reference generated with this dividing means, and to generate a transmitting carrier, A receiving

[0012] In the reader writer which the reader writer of this invention has the controlling element which determines a reference clock value, a transmitted carrier frequency, a received carrier frequency, and a communication link baud rate clock value, and performs a wireless card and radio A dividing means to carry out dividing of the clock inputted from the outside, and to generate a reference clock, A transmitting carrier generation means to generate a transmitting carrier by the reference clock generated with this dividing means, A receiving carrier generation means to generate a receiving carrier by the reference clock generated with the above-mentioned dividing means, A communication link baud rate generation means to generate a communication link baud rate clock by the reference clock generated with the above-mentioned dividing means, The reference clock value determined by the above-mentioned controlling element, a transmitted carrier frequency, a received carrier frequency, Receive the information on a communication link baud rate clock value, and the reference clock value generated with the above-mentioned dividing means based on this received information is set as the above-mentioned dividing means. The transmitted carrier

frequency which carries out generation, and sets up the above-mentioned by consisting of a step which sets up the above-mentioned transmitted carrier carries out generation is set up based on this received information. It is characterized link baud rate clock value, and the above-mentioned reference clock value which determined by the above-mentioned controlling element, a transmitted carrier baud rate clock by the above-mentioned reference clock. The reference clock value above-mentioned reference clock, The step which generates a communication link reference clock, and the step which generates a receiving carrier by the generates a reference clock. The step which generates a transmitting carrier by this value. The step which carries out dividing of the clock inputted from the outside, and frequency, a received carrier frequency, and a communication link baud rate clock controlling element which determines a reference clock value, a transmitted carrier invention It is the communication link conditioning approach of a reader writer with the [0013] The communication link conditioning approach of the reader writer this recovery data to the above-mentioned reception-control means. transmission-control means, and control data processing to the above-mentioned data processing to the above-mentioned transmit data to the above-mentioned and the above-mentioned wireless card, It consists of control means which control generated with the above-mentioned communication link baud rate generation means data from the received data received from the communication link baud rate clock the above-mentioned setting means, A reception-control means to generate recovery generated with the above-mentioned receiving carrier generation means set up with transmitted from the above-mentioned controlling element, The receiving carrier transmission-control means to generate modulation data from the transmit data the above-mentioned communication link baud rate generation means, and a set up with this setting means, The communication link baud rate clock generated with carrier generated with the above-mentioned transmitting carrier generation means above-mentioned communication link baud rate generation means, The transmitting above-mentioned communication link baud rate generation means as the and to set the communication link baud rate clock value generated with the carrier generation means as the above-mentioned receiving carrier generation means to set the received carrier frequency generated with the above-mentioned receiving is set as the above-mentioned transmitting carrier generation means. A setting means frequency which carries out generation, sets up the above-mentioned received carrier frequency, a received carrier frequency, Receive the information on a communication frequency generated with the above-mentioned transmitting carrier generation means

transmitting carrier by this reference clock, and the step which generates a receiving link conditioning approach of a reader writer with the controlling element which invention The step which carries out dividing of the clock which is the communication [0015] The communication link conditioning approach of the reader writer this above-mentioned transmitted carrier frequency, sets up the dividing value which consisting of a step which sets up the dividing value which generates the communication link baud rate clock value, decodes this received Syria ** data, and carrier frequency, The dividing value which receives the serial data of a above-mentioned controlling element, a transmitted carrier frequency, a received communication link baud rate clock, The reference clock value determined by the which carries out dividing of the above-mentioned reference clock, and generates a the above-mentioned reference clock, and generates a receiving carrier. The step clock, and generates a transmitting carrier, and the step which carries out dividing of generates a reference clock, The step which carries out dividing of this reference controlling element which determines a reference clock value, a transmitted carrier invention It is the communication link conditioning approach of a reader writer with the information including a reference clock value, a transmitted carrier frequency, a information that identification information was given to communication link condition step which memorizes beforehand two or more communication link condition from the outside, and generates a reference clock, The step which generates a condition information, and determines communication link conditions, and is inputted specifies the identification information given to two or more communication link value which generates the above-mentioned communication link baud rate clock value. generates the above-mentioned received carrier frequency, and sets up the dividing generates the above-mentioned reference clock value is set up. It is characterized by value. The step which carries out dividing of the clock inputted from the outside, and frequency, a received carrier frequency, and a communication link baud rate clock information which is carrying out [above-mentioned] storage using this identificatior determined by the above-mentioned controlling element, search the identification communication link baud rate clock by the above-mentioned reference clock, The carrier by the above-mentioned reference clock, The step which generates a [0014] The communication link conditioning approach of the reader writer this communication link baud rate clock value which carries out generation information that received, and communication link condition information is called. It the identification information which specifies the communication link conditions eceived carrier frequency, and a communication link baud rate clock value, Receive

carries out setting up the above-mentioned reference clock value which is included in this communication link condition information and which carries out generation, setting up the above-mentioned transmitted carrier frequency which carries out generation, setting up the above-mentioned received carrier frequency which carries out generation, and becoming from the step set up about the above-mentioned communication link baud rate clock value which carries out generation as the description.

generates a received carrier frequency, and sets up the dividing value which which generates a transmitted carrier frequency, sets up the dividing value which the reference clock value included in principle *****, sets up the dividing value characterized by consisting of a step which sets up the dividing value which generates communication link condition information is called. this connoisseur -- it is [above-mentioned] storage using this identification information that received, and element, search the identification information which is carrying out communication link conditions determined by the above-mentioned controlling baud rate clock value, Receive the identification information which specifies the transmitted carrier frequency, a received carrier frequency, and a communication link information including the dividing value which generates a reference clock value, a conditions that identification information was given to communication link condition rate clock. The step which memorizes beforehand two or more communication link of the above-mentioned reference clock, and generates a communication link baud reference clock, and generates a receiving carrier, The step which carries out dividing clock. The step which carries out dividing of this reference clock, and generates a condition information, and is inputted from the outside, and generates a reference determines the identification information given to two or more communication link link conditioning approach of a reader writer with the controlling element which invention The step which carries out dividing of the clock which is the communication [0016] The communication link conditioning approach of the reader writer this transmitting carrier, and the step which carries out dividing of the above-mentioned generates a communication link baud rate clock value.

> which a setup was carried out [above-mentioned], the communication link baud rate set up based on this received information. The step which sets up the which controls data processing to the above-mentioned transmit data, and controls and the above-mentioned wireless card, It is characterized by consisting of a step clock generated with the above-mentioned communication link baud rate clock value received from the receiving carrier generated by the received carrier frequency by controlling element. The step which generates recovery data from the received data modulation data from the transmit data transmitted from the above-mentioned which a setup was carried out [above-mentioned], The step which generates out generation, The transmitting carrier generated by the transmitted carrier sets up the above-mentioned communication link baud rate clock value which carries the above-mentioned received carrier frequency which carries out generation, and above-mentioned transmitted carrier frequency which carries out generation, sets up carrier frequency, Receive the information on a communication link baud rate clock step which generates a receiving carrier by the above-mentioned reference clock, link baud rate clock generated with the communication link baud rate clock value by frequency by which a setup was carried out [above-mentioned], the communication value, and the above-mentioned reference clock value which carries out generation is above-mentioned controlling element, a transmitted carrier frequency, a received above-mentioned reference clock, The reference clock value determined by the The step which generates a communication link baud rate clock by the data processing to the above-mentioned recovery data clock. The step which generates a transmitting carrier by this reference clock, and the

[0018

[Embodiment of the Invention] Hereafter, the gestalt of 1 implementation of this invention is explained with reference to a drawing.

[0019] <u>Drawing 1</u> shows the outline configuration of the wireless card processing system concerning this invention.

[0020] That is, the wireless card processing system is constituted by the wireless (IC) card 4 which performs radio, and — between the personal computer (PC) 1 as high order equipment, and the antenna section 3 of the reader writer (R/W) 2 connected to this PC1, and this reader writer 2.

[0021] PC1 is constituted by the control section which is not illustrated, the control unit, the display, and the connection of the reader writer 2.

[0022] The reader writer 2 is constituted by MPU5 as a control circuit (controlling element) which controls the whole reader writer 2, LSI6 for the wireless card reader

invention It has the controlling element which determines a reference clock value, a transmitted carrier frequency, a received carrier frequency, and a communication link baud rate clock value. The step which carries out dividing of the clock which is the communication link conditioning approach of the reader writer which performs a

[0017] The communication link conditioning approach of the reader writer this

wireless card and radio, and is inputted from the outside, and generates a reference

writers as an interface, the transceiver circuit 7, the antenna section 3, and the input-clock frequency divider 21.

[0023] MPU5 memorizes CPU11 which controls whole MPU5, a control program, and various *****, and is constituted by S1013 the input of the serial data for the communication link with the memory 12 and LSI6 which consist of RAM and a ROM, and for output.

[0024] It connects with the above PC 1, an exchange of data is performed, and CPU11 transmits a data lead command to LSI6 to reception of a data lead command.

[0025] The I/O Port the I/O Port of ** and for the serial input (data SI) serial output data (SO) the I/O Port for serial clocks (SCK) and the I/O Port for control signals.

data (SO), the I/O Port for serial clocks (SCK), and the I/O Port for control signals (CONT) are formed in the above S1013.

[0026] the above S1013 — the data lead command of the wireless card 4 — the I/O Port for SI — mustard — it outputs to SI6.

[0027] The antenna section 3 is constituted by the transmitting antenna 14 and the receiving antenna 15.

[0028] The above-mentioned transceiver circuit 7 is constituted by the sending circuit 16 and the receiving circuit 17.

[0029] The wireless card 4 is constituted by the memory which memorizes various information, such as a control circuit which controls the whole, a control program, a random number, and ID (recognition number) data, the modulation demodulator circuit, the power—source generating circuit, and the transceiver antenna.

[0030] <u>Drawing 2</u> shows the outline configuration of LSI6. LSI6 consists of the input-clock frequency divider 21, MPUI/F22, the transmitting carrier generation circuit 23, the receiving carrier generation circuit 24, a communication link baud rate generation circuit 25, a transmission-control circuit (modulation circuit) 26, and a reception-control circuit (demodulator circuit) 27.

[0031] The input-clock frequency divider 21 carries out dividing of the external clock inputted into the reader writer 2, and generates the clock used as the criteria of a system. For example, the function of the general-purpose reader writer by this invention can be made into that more flexible by establishing the dividing value of 1/1 / 1.5, 1/2, and a 1 / 4 grades. [1 and 1]

[0032] The MPUI/F circuit 22 is an interface (I/F) circuit for software to perform automatically a setup of each register of the above-mentioned input-clock frequency divider 21, the transmitting carrier generation circuit 23, the receiving carrier generation circuit 24, and the communication link baud rate generation circuit 25 through the serial terminal of MPU5. By receiving and decoding the serial data from

MPU5, each register of the above-mentioned input-clock frequency divider 21, the transmitting carrier generation circuit 23, the receiving carrier generation circuit 24, and the communication link baud rate generation circuit 25 is set up.

[0033] The transmitting carrier generation circuit 23 is for setting up the transmitted carrier frequency to the wireless card 4 from the reference clock generated in the

carrier frequency to the wireless card 4 from the reference clock generated in the input-clock frequency divider 21. It realizes by carrying out dividing of the reference clock to any value.

[0034] The receiving carrier generation circuit 24 is for setting up the received carrier frequency of the received data from the wireless card 4 from the reference clock generated in the input-clock frequency divider 21. It realizes by carrying out dividing of the reference clock to any value.

[0035] The communication link baud rate generation circuit 25 is for setting up a communication link baud rate clock (one 16 times the frequency of a baud rate) with the wireless card 4 from the reference clock generated in the input-clock frequency divider 21. It realizes by carrying out dividing of the reference clock to any value. [0036] The transmission-control circuit 26 is a circuit which generates the modulation data to the wireless card 4 with the transmitting carrier generated in the transmitting carrier generated in the transmit data from the communication link baud rate generation circuit 25, and the transmit data from the

[0037] The reception-control circuit 27 is a circuit which generates the recovery data to MPU5 with the received data from the wireless card 4, the receiving carrier generated in the receiving carrier generation circuit 24, and the communication link baud rate clock generated in the communication link baud rate generation circuit 25. [0038] Next, in such a configuration, actuation of the reader writer 2 is explained with reference to the flow chart of <u>drawing 3</u>.

[0039] When a power source is switched on (ST1), the MPUI/F circuit 22 judges the initial communicate mode as a communications protocol with MPU5 (ST2).

[0040] According to this judgment, the MPUL/F circuit 22 receives communication link condition information through serial communication from MPU5. Decode the received communication link condition information and the dividing value of the input-clock frequency divider 21 is set up based on this decoded communication link condition (ST3). The transmitted carrier frequency of the transmitting carrier generation circuit 23 is set up (ST4), the received carrier frequency of the receiving carrier generation circuit 24 is set up (ST5), and the communication link baud rate of the communication link baud rate generation circuit 25 is set up (ST6).

[0041] And from MPU5, the MPUI/F circuit 22 receives the information on the other modes through serial communication, sets up the other modes (ST7), confirms all setup (ST8), and starts the communication link with the wireless card 4 (ST22). [0042] Communication link conditions with the wireless card 4 are set up by the routine of the step 3-STs 6 mentioned above. However, this order of a setup does not ask. These setup is automatically performed after powering on by the software memorized by the memory 12 of MPU5 using serial I/F of MPU5.

[0043] Next, the 1st example in the reader writer 2 constituted concretely is explained with reference to drawing 4. A setup of the reader writer 2 for enabling the communication link with the wireless card 4 which operates on the following communication link conditions is as follows.

[0044] communication link condition input-clock frequency: — 16MHz transmitted carrier frequency: — 125kHz received carrier frequency: — 62.5kHz communication link baud rate: — 7800 bpsMPUI/F circuits 22 follow the flow shown by <u>drawing 3</u>, and set up the reader writer 2. First, in setting up each register in a step 3-STs 6, MPU5 decides what kind of value to set up beforehand.

[0045] Then, it receives through serial communication from MPU5, and the MPUI/F circuit 22 sets up the value determined here to each register of the input-clock frequency divider 21, the transmitting carrier generation circuit 23, the receiving carrier generation circuit 24, and the communication link baud rate generation circuit 25.

[0046] A setup of each register to communication link conditions here is as follows. [0047] a. Set the input-clock dividing value of the input-clock frequency divider 21 as one half, and generate the reference clock (8MHz) used as the base of actuation of the reader writer 2 from an input clock (16MHz).

[0048] b. In order to generate the transmitted carrier frequency (125kHz) to the reference clock generated in the input-clock frequency divider 21, set the dividing value of the transmitting carrier generation circuit 23 as 1/64.

[0049] c. In order to generate the received carrier frequency (62.5kHz) to the reference clock generated in the input-clock frequency divider 21, set the dividing value of the receiving carrier generation circuit 24 as 1/128.

[0050] d. In order to set up the communication link baud rate (7800bps) to the reference clock generated in the input-clock frequency divider 21, set the dividing value of the communication link baud rate generation circuit 25 as 1/64. The clock generated here is 16 times the frequency of a baud rate.

[0051] Thus, by setting up, the communication link with the wireless card 4 equipped

with the above-mentioned communication link conditions is attained. However, the order of a setup of a, b, c, and d does not ask. Moreover, the set point (dividing value) of each register shown here is an example, and must not necessarily be set up in this way to the above-mentioned communication link conditions. A system construction person can specify the set point of each register as arbitration.

[0052] Next, the 2nd example in the reader writer 2 constituted concretely is explained with reference to $\underline{\text{drawing 5}}$. An input clock is changed into 8MHz to the communication link conditions shown by $\underline{\text{drawing 4}}$, and other conditions are the same as drawing 4.

[0053] The MPUI/F circuit 22 follows the flow shown by $\frac{drawing 3}{2}$, and sets up the reader writer 2.

[0054] a. Set the input-clock dividing value of the input-clock frequency divider 21 as 1/1, and generate the reference clock (8MHz) used as the base of actuation of the reader writer 2 from an input clock (8MHz). In addition, about the dividing value of the b. transmitting carrier generation circuit 23, the dividing value of the c. receiving carrier generation circuit 24, and the dividing value of d. communication link baud rate generation circuit 25, it is the same as drawing 4.

[0055] Thus, by setting up, the communication link with the wireless card 4 equipped with the above-mentioned communication link conditions is attained. However, the order of a setup of Above a, b, c, and d does not ask. Moreover, the set point (dividing value) of each register shown here is an example, and must not necessarily be set up in this way to the above-mentioned communication link conditions. A system construction person can specify the set point of each register as arbitration. [0056] Next, the 3rd example in the reader writer 2 constituted concretely is explained with reference to drawing 6. A setup of the reader writer 2 for enabling the communication link with the wireless card 4 which operates on the following communication link conditions is as follows.

[0057] communication link condition input-clock frequency: — 13.56MHz transmitted carrier frequency: — 3.322MHz received carrier frequency: — 847.5kHz communication link baud rate: — 106 kbpsMPUI/F circuits 22 follow the flow shown by drawing 3, and set up the reader writer 2. First, in setting up each register in a step 3-STs 6, MPU5 decides what kind of value to set up beforehand.

[0058] Then, it receives through serial communication from MPU5, and the MPU1/F circuit 22 sets up the value determined here to each register of the input-clock frequency divider 21, the transmitting carrier generation circuit 23, the receiving carrier generation circuit 24, and the communication link baud rate generation circuit

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[0059] A setup of each register to communication link conditions here is as follows. [0060] a. Set the input-clock dividing value of the input-clock frequency divider 21 as 1/1, and generate the reference clock (13.56MHz) used as the base of actuation of a reader writer from an input clock (13.56MHz).

[0061] b. In order to generate the transmitted carrier frequency (3.322MHz) to the reference clock generated in the input-clock frequency divider 21, set the dividing value of the transmitting carrier generation circuit 23 as one fourth.

[0062] c. In order to generate the received carrier frequency (847.5kHz) to the reference clock generated in the input-clock frequency divider 21, set the dividing value of the receiving carrier generation circuit 24 as 1/16.

[0063] d. In order to set up the communication link baud rate to the reference clock generated in the input-clock frequency divider 21 (106kbps), set the dividing value of the communication link baud rate generation circuit 25 as one eighth. The clock generated here is 16 times the frequency of a baud rate.

[0064] Thus, by setting up, the communication link with the wireless card 4 equipped with the above-mentioned communication link conditions is attained. However, the order of a setup of a, b, c, and d does not ask moreover, the set point (dividing value) of each register shown here is an example, and is not necessarily set up in this way to the above-mentioned communication link conditions — it can kick, and if it is **, there is not necessarily nothing. A system construction person can specify the set point of each register as arbitration.

[0065] Next, the 4th example adapting the configuration in the reader writer 2 is explained with reference to $\underline{\text{drawing } I}$. In this example, the communication link conditioning data storage memory 28 is prepared as an additional function.

[0066] In order to confirm the reader writer 2 to the wireless card 4 which is operating by the radical of some communication link conditions as shown above, it is necessary to set up each setting register of a step 3-STs 6 from MPU5. Although the register is accessed and set up according to an individual, respectively, now, processing occurs repeatedly and it becomes complicated.

[0067] So, in this example, the communication link conditioning data storage memory 10 which made these setting information memorize beforehand is prepared, and it specifies which [of memory information] MPU5 confirms. The MPUI/F circuit 22 sets up a communication link condition register automatically from the specified memory information.

[0068] Here, processing actuation of **** 4 example is explained with reference to

the flow chart of drawing 8

[0069] When a power source is switched on (ST11), the MPUI/F circuit 22 judges the initial communicate mode as a communications protocol with MPU5 (ST12).

[0070] According to assignment of which [of the memory information from MPU5] the MPUI/F circuit 22 confirms, memory information is called from the communication link conditioning data storage memory 28 (ST13). Decode the contents of this memory information (ST14), and the dividing value of the input-clock frequency divider 21 is set up based on this decoded communication link conditioning data (ST15). The transmitted carrier frequency of the transmitting carrier generation circuit 23 is set up (ST16), the received carrier frequency of the receiving carrier generation circuit 24 is set up (ST17), and the communication link baud rate of the communication link baud rate generation circuit 25 is set up (ST18).

[0071] And from MPU5, the MPUI/F circuit 22 sets up the other modes through seria communication (ST19), confirms all setup (ST20), and starts the communication link with the wireless card 4 (ST21).

[0072] <u>Drawing 9</u> is the example of a configuration of the memory information stored in the communication link conditioning data storage memory 28. For example, when a specification is in ISO10xxx mode, the address is set up with the 00th street and the function (register set point) is set up with input clocks 1/1, the transmitting carriers 1/1, the receiving carriers 1/16, and baud rates 1/32.

[0073] In the example of a configuration of this memory information, register setting information is arranged in the communication link conditioning data storage memory 28 for every functional specifications. When making it a setup corresponding to ISO10xxx mode, MPU5 can set up the reader writer 2 by [of the communication link conditioning data storage memory 28] confirming the 00th street.

[0074] <u>Drawing 10</u> is other examples of a configuration of the memory information stored in the communication link conditioning data storage memory 28. For example, in the case of input-clock:16MHz, transmitting carrier:125kHz, receiving carrier:62.5kHz, and communication link baud rate:7800bps, the address is set up with the 00th street and the function (register set point) is set up for the specification with input clocks 1/2, the transmitting carriers 1/64, the receiving carriers 1/128, and baud rates 1/64. [0075] In the example of a configuration of this memory information, register setting information is arranged in the communication link conditions. For example, by setting the communication link conditions shown by <u>drawing 4</u> as the 00th street of the communication link conditioning data storage memory 28, if the 00th street is

confirmed, a setup of the reader writer 2 will become the thing corresponding to this communication link condition which is the communication link conditioning data storage memory 10 from MPU5.

[0076] Next, the 5th example is explained with reference to drawing 11.

[0077] The differences with <u>drawing 2</u> in **** 5 example are the transmission-control circuit 31 and the reception-control circuit 32.

[0078] The transmission-control circuit (modulation circuit) 31 is a circuit which generates the modulation data to the wireless card 4 with the transmitting carrier generated in the transmitting carrier generation circuit 23, the communication link baud rate clock generated in the communication link baud rate generation circuit 25, and the transmit data from the MPUI/F circuit 22. Moreover, the existence of data processing is controllable by the data-processing control signal from the MPUI/F circuit 22 to transmit data.

[0079] Specifically, it is addition of 1 synchronous character data. At this time, the character value and character length of a synchronous character can specify it as arbitration from MPU5 separately.

[0080] 2) Addition of CRC operation data.

[0081] 3) Addition of a frame start character / frame termination character. Addition of a frame start/termination character can be specified according to an individual [0082] It has ******.

[0083] The reception-control circuit (demodulator circuit) 32 is a circuit which generates the recovery data to MPU5 with the received data from the wireless card 4, the receiving carrier generated in the receiving carrier generation circuit 24, and the communication link baud rate clock generated in the communication link baud rate generation circuit 25. Moreover, the existence of processing of data is controllable by the data-processing control signal from the MPUI/F circuit 22 to recovery data.

[0084] Specifically, it is deletion of 1 synchronous character data. At this time, the character value and character length of a synchronous character can specify it as arbitration from MPU5 separately.

[0085] 2) CRC operation acknowledgement function (error detection function).

[0086] 3) Deletion of a frame start character / frame termination character. Deletion of a frame start/termination character can be specified according to an individual. [0087] It has ******.

[0088] <u>Drawing 12</u> is the example of transmit data processing by the data-processing control signal in the transmission-control circuit 31. The radical data shown in (a) of <u>drawing 12</u> are serial data transmitted from MPU5, and are these data which should be

transmitted to the wireless card 4. Hereafter, six sorts of examples are shown and processing of the data to this radical data is explained. It is the example which is shown here to the last, and it is not what showed all realizable combination. [0089] (b) shows the condition of the transmit data in the case of adding 1 byte of synchronous character. The synchronous character is added to the head of radical

data. For example, the character of 92H is added.
[0090] (c) shows the condition of the transmit data in the case of adding 2 bytes of

synchronous character. The synchronous character is added to the head of radical

data. For example, the character of 9292H is added.

[0091] (d) shows the condition of the transmit data in the case of adding a CRC operation. The CRC operation was performed to radical data and the result of an operation is added after the last data transmission of these data. For example, wher calculating CRC16, the result of an operation is added to 16 bits.

[0092] (e) shows the condition of the transmit data in the case of adding an initiation frame (SOF) / termination frame (EOF) before and after radical data, respectively. For example, the "High level" of a triplet can be added from the "Low level" of 10 to 11 bits, and 2 as SOF. Moreover, the "Low level" of 10 to 11 bits can be added as EOF. [0093] (f) shows the condition of the transmit data in the case of adding an initiation frame (SOF) to the anterior part of radical data.

[0094] (g) shows the condition of the transmit data in the case of adding a termination frame (EOF) to the posterior part of radical data.

[0095] Processing of the recovery data based on the data-processing control signal in the reception-control circuit 32 performs the reverse of transmit data processing shown in (b) – (g) of <u>drawing 12</u>. For example, the recovery data which deleted only the synchronous character from the recovery data with which the synchronous character from the data with which the synchronous character was added to the head are generated, and it transmits as serial data to MPU5 (radical data are generated from the data of (b) of <u>drawing 12</u>).

[0096] As explained above, according to the gestalt of implementation of the above-mentioned invention, the general-purpose reader writer corresponding to a wireless card with various communication link conditions (an input-clock frequency, a received carrier frequency, a transmitted carrier frequency, transceiver communication link baud rate) is realizable.

[0097] Moreover, by using a reader writer widely, the need of manufacturing the reader writer system corresponding to each wireless card according to an individual is lost, and development effectiveness and the effectiveness of a maintenance improve. [0098] Moreover, a functional setting register can be performed through serial I/F of

MPU, and since it has realized without adding an extraordinarily difficult function, it can master easily only by getting to know the fundamental operating instructions of MPU.

[0099] In addition, it becomes possible from MPU by storing information in memory also about each setting command about processing control of a transmitted and received data to set up automatically.

5100

[Effect of the Invention] As explained in full detail above, according to this invention the versatility corresponding to various communication link conditions can be given, and the communication link conditioning approach of a reader writer and a reader writer which can raise development effectiveness and the effectiveness of a maintenance can be offered.

[Translation done.]

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TECHNICAL FIELD

[Field of the Invention] This invention exchanges data between high order equipment and a wireless card, and relates to the communication link conditioning approach of a reader writer and a reader writer which consists of an interface with these, and MPU which controls the whole.

[Translation done.]

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PRIOR ART

[Description of the Prior Art] Conventionally, the wireless card processing system for wireless cards consists of a host (high order equipment, PC), a reader writer (R/W), and a wireless card. The above-mentioned reader writer connects a host (PC) and a wireless card. This reader writer is constituted by the interface and transceiver circuit which consist of MPU and LSI which control the whole.

[0003] The wireless (IC) card is operating on various communication link conditions by the class each. The reader writer for performing the communication link with these wireless card until now was manufacturing respectively the thing with the communicate mode corresponding to the communication link conditions of a wireless card. Therefore, it is necessary to prepare the reader writer B' for a wireless card with the communication link conditions [writer / A' / reader] B at a wireless card with the communication link conditions A.

[0004] The communication link conditions said here are a "received carrier frequency", a "transmitted carrier frequency", and a "transceiver communication link baud rate."

[0005] However, making a reader writer according to the communication link conditions of each wireless card has very bad development effectiveness. Moreover, although making a reader writer with other completely equivalent functions only from only communication link conditions differing by the class of a wireless card did not have a problem technically, the effort serious in development effectiveness and a maintenance side occurred, and there was a problem that effectiveness worsened.

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EFFECT OF THE INVENTION

[Effect of the Invention] As explained in full detail above, according to this invention, the versatility corresponding to various communication link conditions can be given, and the communication link conditioning approach of a reader writer and a reader writer which can raise development effectiveness and the effectiveness of a maintenance can be offered.

[Translation done.]

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] Although making a reader writer according to the communication link conditions of each wireless card had very bad development effectiveness and it did not have a problem technically that only communication link conditions only differ and other functions completely make an equivalent reader writer by the class of a wireless card as described above, the effort serious in development

effectiveness and a maintenance side occurred, and there was a problem that effectiveness worsened.

[0007] Then, this invention gives the versatility corresponding to various communication link conditions, and aims at offering the communication link conditioning approach of a reader writer and a reader writer which can raise development effectiveness and the effectiveness of a maintenance.

[Translation done.]

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MEANS

[Means for Solving the Problem] In a reader writer with the controlling element as which the reader writer of this invention determines a reference clock value, a transmitted carrier frequency, a received carrier frequency, and a communication link baud rate clock value A dividing means to carry out dividing of the clock inputted from the outside, and to generate a reference clock, A transmitting carrier generation means to generate a transmitting carrier by the reference clock generated with this dividing means, A receiving carrier generation means to generate a receiving carrier by the reference clock generated with the above-mentioned dividing means, A communication link baud rate generation means to generate a communication link baud rate clock by the reference clock generated with the above-mentioned dividing means, The reference clock value determined by the above-mentioned controlling element, a transmitted carrier frequency, a received carrier frequency, Receive the information on a communication link baud rate clock value, and the reference clock value generated with the above-mentioned dividing means based on this received

which generates the above-mentioned communication link baud rate clock value as value which generates the above-mentioned received carrier frequency as the transmitting carrier generation means. It consists of setting means to set the dividing above-mentioned transmitted carrier frequency is set as the above-mentioned above-mentioned dividing means. The dividing value which generates the and generates the above-mentioned reference clock value is set as the data of a communication link baud rate clock value, decodes this received serial data and to generate a communication link baud rate clock. The reference clock value dividing of the reference clock generated with the above-mentioned dividing means, receiving carrier, A communication link baud rate generation means to carry out clock generated with the above-mentioned dividing means, and to generate a carrier, A receiving carrier generation means to carry out dividing of the reference reference clock generated with this dividing means, and to generate a transmitting reference clock, A transmitting carrier generation means to carry out dividing of the means to carry out dividing of the clock inputted from the outside, and to generate a received carrier frequency, and a communication link baud rate clock value A dividing value generated with the above-mentioned communication link baud rate generation receiving carrier generation means, and to set the communication link baud rate clock above-mentioned receiving carrier generation means as the above-mentioned setting means to set the received carrier frequency generated with the is set as the above-mentioned transmitting carrier generation means. It consists of [0010] In a reader writer with the controlling element which the reader writer of this the above-mentioned communication link baud rate generation means. frequency, a received carrier frequency, The dividing value which receives the serial determined by the above-mentioned controlling element, a transmitted carrier this invention determines a reference clock value, a transmitted carrier frequency, a means as the above-mentioned communication link baud rate generation means. frequency generated with the above-mentioned transmitting carrier generation means carrier by the reference clock generated with this dividing means, A receiving carries reference clock, A transmitting carrier generation means to generate a transmitting means to carry out dividing of the clock inputted from the outside, and to generate a link condition information, and determines communication link conditions A dividing invention specifies the identification information given to two or more communication above-mentioned receiving carrier generation means, and to set the dividing value [0009] In a reader writer with the controlling element as which the reader writer of information is set as the above-mentioned dividing means. The transmitted carrier

a communication link baud rate clock value are memorized beforehand, Receive the communication link baud rate clock, A reference clock value, a transmitted carrier or more communication link condition information A dividing means to carry out above-mentioned communication link baud rate generation means as the and to set the communication link baud rate clock value generated with the to set the received carrier frequency generated with the above-mentioned receiving above-mentioned transmitting carrier generation means. It consists of setting means the above-mentioned transmitting carrier generation means is set as the above-mentioned dividing means. The transmitted carrier frequency generated with reference clock value generated with the above-mentioned dividing means as storage means is searched using this identification information that received. The determined by the above-mentioned controlling element, and the above-mentioned communication link baud rate clock value is memorized beforehand; Receive the information was given to communication link condition information including a transmitted carrier frequency, a received carrier frequency, and a storage means by clock generated with the above-mentioned dividing means, and to generate a the above-mentioned dividing means, and to generate a receiving carrier, A carrier generation means to carry out dividing of the reference clock generated with generated with this dividing means, and to generate a transmitting carrier, A receiving dividing of the clock inputted from the outside, and to generate a reference clock, A identification information by which the reader writer of this invention was given to two [0011] In a reader writer with the controlling element which determines the above-mentioned communication link baud rate generation means. carrier generation means as the above-mentioned receiving carrier generation means communication link condition information retrieved and called is set as the identification information which specifies the communication link conditions which two or more communication link condition information that identification generated with the above-mentioned dividing means, A reference clock value, a means to generate a communication link baud rate clock by the reference clock communication link condition information including the dividing value which generates communication link conditions that identification information was given to frequency, a received carrier frequency, and a storage means by which two or more communication link baud rate generation means to carry out dividing of the reference transmitting carrier generation means to carry out dividing of the reference clock with the above-mentioned dividing means, A communication link baud rate generation generation means to generate a receiving carrier by the reference clock generated

identification information which specifies the communication link conditions determined by the above-mentioned controlling element, and the above-mentioned storage means is searched using this identification information that received. The dividing value which generates the reference clock value as communication link condition information retrieved and called is set as the above-mentioned dividing means. The dividing value which generates a transmitted carrier frequency is set as the above-mentioned transmitting carrier generation means. It consists of setting means to set the dividing value which generates a received carrier frequency as the above-mentioned receiving carrier generation means, and to set the dividing value which generates a communication link baud rate clock value as the above-mentioned communication link baud rate generation means.

the above-mentioned communication link baud rate generation means, and a set up with this setting means, The communication link baud rate clock generated with carrier generated with the above-mentioned transmitting carrier generation means above-mentioned communication link baud rate generation means, The transmitting above-mentioned communication link baud rate generation means as the and to set the communication link baud rate clock value generated with the carrier generation means as the above-mentioned receiving carrier generation means to set the received carrier frequency generated with the above-mentioned receiving is set as the above-mentioned transmitting carrier generation means. A setting means frequency generated with the above-mentioned transmitting carrier generation means information is set as the above-mentioned dividing means. The transmitted carrier value generated with the above-mentioned dividing means based on this received information on a communication link baud rate clock value, and the reference clock element, a transmitted carrier frequency, a received carrier frequency, Receive the means. The reference clock value determined by the above-mentioned controlling baud rate clock by the reference clock generated with the above-mentioned dividing communication link baud rate generation means to generate a communication link carrier by the reference clock generated with the above-mentioned dividing means, A with this dividing means. A receiving carrier generation means to generate a receiving generation means to generate a transmitting carrier by the reference clock generated inputted from the outside, and to generate a reference clock, A transmitting carrier performs a wireless card and radio A dividing means to carry out dividing of the clock received carrier frequency, and a communication link baud rate clock value, and element which determines a reference clock value, a transmitted carrier frequency, a [0012] In the reader writer which the reader writer of this invention has the controlling

which carries out dividing of the above-mentioned reference clock, and generates a communication link baud rate clock value which carries out generation by consisting of a step which sets up the above-mentioned transmitted carrier link baud rate clock value, and the above-mentioned reference clock value which baud rate clock by the above-mentioned reference clock. The reference clock value value. The step which carries out dividing of the clock inputted from the outside, and controlling element which determines a reference clock value, a transmitted carrier transmission-control means, and control data processing to the above-mentioned generated with the above-mentioned communication link baud rate generation means the above-mentioned reference clock, and generates a receiving carrier, The step clock, and generates a transmitting carrier, and the step which carries out dividing of generates a reference clock, The step which carries out dividing of this reference value. The step which carries out dividing of the clock inputted from the outside, and frequency, a received carrier frequency, and a communication link baud rate clock controlling element which determines a reference clock value, a transmitted carrier invention It is the communication link conditioning approach of a reader writer with the frequency which carries out generation, and sets up the above-mentioned carries out generation is set up based on this received information. It is characterized frequency, a received carrier frequency, Receive the information on a communication determined by the above-mentioned controlling element, a transmitted carrier above-mentioned reference clock, The step which generates a communication link reference clock, and the step which generates a receiving carrier by the generates a reference clock. The step which generates a transmitting carrier by this frequency, a received carrier frequency, and a communication link baud rate clock invention It is the communication link conditioning approach of a reader writer with the [0013] The communication link conditioning approach of the reader writer this data processing to the above-mentioned transmit data to the above-mentioned and the above-mentioned wireless card, It consists of control means which control data from the received data received from the communication link baud rate clock the above-mentioned setting means, A reception-control means to generate recovery generated with the above-mentioned receiving carrier generation means set up with transmitted from the above-mentioned controlling element, The receiving carrier [0014] The communication link conditioning approach of the reader writer this frequency which carries out generation, sets up the above-mentioned received carrier recovery data to the above-mentioned reception-control means. transmission-control means to generate modulation data from the transmit data

carrier frequency, The dividing value which receives the serial data of a out generation, and becoming from the step set up about the above-mentioned carries out setting up the above-mentioned reference clock value which is included in information that received, and communication link condition information is called. It information which is carrying out [above-mentioned] storage using this identification determined by the above-mentioned controlling element, search the identification information including a reference clock value, a transmitted carrier frequency, a information that identification information was given to communication link condition step which memorizes beforehand two or more communication link condition communication link baud rate clock by the above-mentioned reference clock, The carrier by the above-mentioned reference clock, The step which generates a transmitting carrier by this reference clock, and the step which generates a receiving from the outside, and generates a reference clock, The step which generates a condition information, and determines communication link conditions, and is inputted specifies the identification information given to two or more communication link link conditioning approach of a reader writer with the controlling element which invention The step which carries out dividing of the clock which is the communication [0015] The communication link conditioning approach of the reader writer this value which generates the above-mentioned communication link baud rate clock value generates the above-mentioned received carrier frequency, and sets up the dividing above-mentioned transmitted carrier frequency, sets up the dividing value which consisting of a step which sets up the dividing value which generates the generates the above-mentioned reference clock value is set up. It is characterized by communication link baud rate clock value, decodes this received Syria ** data, and above-mentioned controlling element, a transmitted carrier frequency, a received communication link baud rate clock value which carries out generation as the generation, setting up the above-mentioned received carrier frequency which carries setting up the above-mentioned transmitted carrier frequency which carries out this communication link condition information and which carries out generation, the identification information which specifies the communication link conditions received carrier frequency, and a communication link baud rate clock value, Receive communication link baud rate clock, The reference clock value determined by the

[0016] The communication link conditioning approach of the reader writer this invention The step which carries out dividing of the clock which is the communication link conditioning approach of a reader writer with the controlling element which

wireless card and radio, and is inputted from the outside, and generates a reference generates a communication link baud rate clock value. the reference clock value included in principle *****, sets up the dividing value characterized by consisting of a step which sets up the dividing value which generates communication link condition information is called this connoisseur -- it is [above-mentioned] storage using this identification information that received, and element, search the identification information which is carrying out communication link conditions determined by the above-mentioned controlling transmitted carrier frequency, a received carrier frequency, and a communication link rate clock. The step which memorizes beforehand two or more communication link transmitting carrier, and the step which carries out dividing of the above-mentioned clock, The step which carries out dividing of this reference clock, and generates a condition information, and is inputted from the outside, and generates a reference set up based on this received information. The step which sets up the carrier frequency, Receive the information on a communication link baud rate clock above-mentioned controlling element, a transmitted carrier frequency, a received clock, The step which generates a transmitting carrier by this reference clock, and the communication link conditioning approach of the reader writer which performs a baud rate clock value. The step which carries out dividing of the clock which is the transmitted carrier frequency, a received carrier frequency, and a communication link invention It has the controlling element which determines a reference clock value, a [0017] The communication link conditioning approach of the reader writer this generates a received carrier frequency, and sets up the dividing value which which generates a transmitted carrier frequency, sets up the dividing value which baud rate clock value, Receive the identification information which specifies the information including the dividing value which generates a reference clock value, a conditions that identification information was given to communication link condition of the above-mentioned reference clock, and generates a communication link baud reference clock, and generates a receiving carrier, The step which carries out dividing the above-mentioned received carrier frequency which carries out generation, and value, and the above-mentioned reference clock value which carries out generation is step which generates a receiving carrier by the above-mentioned reference clock, determines the identification information given to two or more communication link above-mentioned reference clock, The reference clock value determined by the The step which generates a communication link baud rate clock by the above-mentioned transmitted carrier frequency which carries out generation, sets up

sets up the above-mentioned communication link baud rate clock value which carries out generation. The transmitting carrier generated by the transmitted carrier frequency by which a setup was carried out [above-mentioned], the communication link baud rate clock generated with the communication link baud rate clock value by which a setup was carried out [above-mentioned]. The step which generates modulation data from the transmit data transmitted from the above-mentioned controlling element. The step which generates recovery data from the received data received from the receiving carrier generated by the received carrier frequency by which a setup was carried out [above-mentioned], the communication link baud rate clock generated with the above-mentioned communication link baud rate clock value, and the above-mentioned wireless card, It is characterized by consisting of a step which controls data processing to the above-mentioned recovery data.

<u>00</u>

[Embodiment of the Invention] Hereafter, the gestalt of 1 implementation of this invention is explained with reference to a drawing.

 $[0019] \frac{1}{Drawing 1}$ shows the outline configuration of the wireless card processing system concerning this invention.

[0020] That is, the wireless card processing system is constituted by the wireless (IC) card 4 which performs radio, and — between the personal computer (PC) 1 as high order equipment, and the antenna section 3 of the reader writer (R/W) 2 connected to this PC1, and this reader writer 2.

[0021] PC1 is constituted by the control section which is not illustrated, the control unit, the display, and the connection of the reader writer 2.

[0022] The reader writer 2 is constituted by MPU5 as a control circuit (controlling element) which controls the whole reader writer 2, LSI6 for the wireless card reader writers as an interface, the transceiver circuit 7, the antenna section 3, and the input-clock frequency divider 21.

[0023] MPU5 memorizes CPU11 which controls whole MPU5, a control program, and various ****, and is constituted by S1013 the input of the serial data for the communication link with the memory 12 and LSI6 which consist of RAM and a ROM, and for output.

[0024] It connects with the above PC 1, an exchange of data is performed, and CPU11 transmits a data lead command to LSI6 to reception of a data lead command. [0025] The I/O Port the I/O Port of ** and for the serial input (data SI) serial output data (SO), the I/O Port for serial clocks (SCK), and the I/O Port for control signals

(CONT) are formed in the above S1013.

[0026] the above S1013 — the data lead command of the wireless card 4 — the I/O Port for SI — mustard — it outputs to SI6.

[0027] The antenna section 3 is constituted by the transmitting antenna 14 and the receiving antenna 15.

[0028] The above-mentioned transceiver circuit 7 is constituted by the sending circuit 16 and the receiving circuit 17.

[0029] The wireless card 4 is constituted by the memory which memorizes various information, such as a control circuit which controls the whole, a control program, a random number, and ID (recognition number) data, the modulation demodulator circuit, the power—source generating circuit, and the transceiver antenna.

[0030] <u>Drawing 2</u> shows the outline configuration of LSI6. LSI6 consists of the input-clock frequency divider 21, MPUI/F22, the transmitting carrier generation circuit 23, the receiving carrier generation circuit 24, a communication link baud rate generation circuit 25, a transmission-control circuit (modulation circuit) 26, and a reception-control circuit (demodulator circuit) 27.

[0031] The input-clock frequency divider 21 carries out dividing of the external clock inputted into the reader writer 2, and generates the clock used as the criteria of a system. For example, the function of the general-purpose reader writer by this invention can be made into that more flexible by establishing the dividing value of 1/1, 1.5, 1/2, and a 1/4 grades. [1 and 1]

[0032] The MPUI/F circuit 22 is an interface (I/F) circuit for software to perform automatically a setup of each register of the above-mentioned input-clock frequency divider 21, the transmitting carrier generation circuit 23, the receiving carrier generation circuit 24, and the communication link baud rate generation circuit 25 through the serial terminal of MPU5. By receiving and decoding the serial data from MPU5, each register of the above-mentioned input-clock frequency divider 21, the transmitting carrier generation circuit 23, the receiving carrier generation circuit 24, and the communication link baud rate generation circuit 25 is set up.

[0033] The transmitting carrier generation circuit 23 is for setting up the transmitted carrier frequency to the wireless card 4 from the reference clock generated in the input-clock frequency divider 21. It realizes by carrying out dividing of the reference clock to any value.

[0034] The receiving carrier generation circuit 24 is for setting up the received carrier frequency of the received data from the wireless card 4 from the reference clock generated in the input-clock frequency divider 21. It realizes by carrying out dividing

of the reference clock to any value.

[0035] The communication link baud rate generation circuit 25 is for setting up a communication link baud rate clock (one 16 times the frequency of a baud rate) with the wireless card 4 from the reference clock generated in the input-clock frequency divider 21. It realizes by carrying out dividing of the reference clock to any value. [0036] The transmission-control circuit 26 is a circuit which generates the modulation data to the wireless card 4 with the transmitting carrier generated in the transmitting carrier generation circuit 23, the communication link baud rate generation circuit 25, and the transmit data from the MPUL/F circuit 22.

[0037] The reception-control circuit 27 is a circuit which generates the recovery data to MPU5 with the received data from the wireless card 4, the receiving carrier generated in the receiving carrier generation circuit 24, and the communication link baud rate clock generated in the communication link baud rate generation circuit 25. [0038] Next, in such a configuration, actuation of the reader writer 2 is explained with reference to the flow chart of drawing 3.

[0039] When a power source is switched on (ST1), the MPUI/F circuit 22 judges the initial communicate mode as a communications protocol with MPU5 (ST2).

[0040] According to this judgment, the MPUL/F circuit 22 receives communication link condition information through serial communication from MPU5. Decode the received communication link condition information and the dividing value of the input-clock frequency divider 21 is set up based on this decoded communication link condition (ST3). The transmitted carrier frequency of the transmitting carrier generation circuit 23 is set up (ST4), the received carrier frequency of the receiving carrier generation circuit 24 is set up (ST5), and the communication link baud rate generation circuit 25 is set up (ST6).

[0041] And from MPU5, the MPUI/F circuit 22 receives the information on the other modes through serial communication, sets up the other modes (ST7), confirms all setup (ST8), and starts the communication link with the wireless card 4 (ST22).

[0042] Communication link conditions with the wireless card 4 are set up by the routine of the step 3-STs 6 mentioned above. However, this order of a setup does not ask. These setup is automatically performed after powering on by the software memorized by the memory 12 of MPU5 using serial I/F of MPU5.

[0043] Next, the 1st example in the reader writer 2 constituted concretely is explained with reference to $\frac{drawing 4}{2}$. A setup of the reader writer 2 for enabling the communication link with the wireless card 4 which operates on the following

communication link conditions is as follows.

[0044] communication link condition input-clock frequency: — 16MHz transmitted carrier frequency: — 125kHz received carrier frequency: — 62.5kHz communication link baud rate: — 7800 bpsMPUI/F circuits 22 follow the flow shown by <u>drawing 3</u>, and set up the reader writer 2. First, in setting up each register in a step 3-STs 6, MPU5 decides what kind of value to set up beforehand.

[0045] Then, it receives through serial communication from MPU5, and the MPUI/F circuit 22 sets up the value determined here to each register of the input-clock frequency divider 21, the transmitting carrier generation circuit 23, the receiving carrier generation circuit 24, and the communication link baud rate generation circuit 25.

[0046] A setup of each register to communication link conditions here is as follows. [0047] a. Set the input-clock dividing value of the input-clock frequency divider 21 as one half, and generate the reference clock (8MHz) used as the base of actuation of the reader writer 2 from an input clock (16MHz).

[0048] b. In order to generate the transmitted carrier frequency (125kHz) to the reference clock generated in the input-clock frequency divider 21, set the dividing value of the transmitting carrier generation circuit 23 as 1/64.

[0049] c. In order to generate the received carrier frequency (62.5kHz) to the reference clock generated in the input-clock frequency divider 21, set the dividing value of the receiving carrier generation circuit 24 as 1/128.

[0050] d. In order to set up the communication link baud rate (7800bps) to the reference clock generated in the input-clock frequency divider 21, set the dividing value of the communication link baud rate generation circuit 25 as 1/64. The clock generated here is 16 times the frequency of a baud rate.

[0051] Thus, by setting up, the communication link with the wireless card 4 equipped with the above-mentioned communication link conditions is attained. However, the order of a setup of a, b, c, and d does not ask. Moreover, the set point (dividing value) of each register shown here is an example, and must not necessarily be set up in this way to the above-mentioned communication link conditions. A system construction person can specify the set point of each register as arbitration.

[0052] Next, the 2nd example in the reader writer 2 constituted concretely is explained with reference to $\underline{\text{drawing 5}}$. An input clock is changed into 8MHz to the communication link conditions shown by $\underline{\text{drawing 4}}$, and other conditions are the same as $\underline{\text{drawing 4}}$.

0053] The MPUI/F circuit 22 follows the flow shown by drawing 3, and sets up the

eager writer 2.

[0054] a. Set the input-clock dividing value of the input-clock frequency divider 21 as 1/1, and generate the reference clock (8MHz) used as the base of actuation of the reader writer 2 from an input clock (8MHz). In addition, about the dividing value of the b. transmitting carrier generation circuit 23, the dividing value of the c. receiving carrier generation circuit 24, and the dividing value of d. communication link baud rate generation circuit 25, it is the same as drawing 4.

[0055] Thus, by setting up, the communication link with the wireless card 4 equipped with the above-mentioned communication link conditions is attained. However, the order of a setup of Above a, b, c, and d does not ask. Moreover, the set point (dividing value) of each register shown here is an example, and must not necessarily be set up in this way to the above-mentioned communication link conditions. A system construction person can specify the set point of each register as arbitration. [0056] Next, the 3rd example in the reader writer 2 constituted concretely is explained with reference to drawing 6. A setup of the reader writer 2 for enabling the communication link with the wireless card 4 which operates on the following communication link conditions is as follows.

[0057] communication link condition input-clock frequency: — 13.56MHz transmitted carrier frequency: — 3.322MHz received carrier frequency: — 847.5kHz communication link baud rate: — 106 kbpsMPUI/F circuits 22 follow the flow shown by drawing 3, and set up the reader writer 2. First, in setting up each register in a step 3-STs 6, MPU5 decides what kind of value to set up beforehand.

[0058] Then, it receives through serial communication from MPU5, and the MPU1/F circuit 22 sets up the value determined here to each register of the input-clock frequency divider 21, the transmitting carrier generation circuit 23, the receiving carrier generation circuit 24, and the communication link baud rate generation circuit 25.

[0059] A setup of each register to communication link conditions here is as follows. [0060] a. Set the input-clock dividing value of the input-clock frequency divider 21 as 1/1, and generate the reference clock (13.56MHz) used as the base of actuation of a reader writer from an input clock (13.56MHz).

[0061] b. In order to generate the transmitted carrier frequency (3.322MHz) to the reference clock generated in the input-clock frequency divider 21, set the dividing value of the transmitting carrier generation circuit 23 as one fourth.

[0062] c. In order to generate the received carrier frequency (847.5kHz) to the

reference clock generated in the input-clock frequency divider 21, set the dividing

value of the receiving carrier generation circuit 24 as 1/16.

[0063] d. In order to set up the communication link baud rate to the reference clock generated in the input-clock frequency divider 21 (106kbps), set the dividing value of the communication link baud rate generation circuit 25 as one eighth. The clock generated here is 16 times the frequency of a baud rate.

[0064] Thus, by setting up, the communication link with the wireless card 4 equipped with the above-mentioned communication link conditions is attained. However, the order of a setup of a, b, c, and d does not ask moreover, the set point (dividing value) of each register shown here is an example, and is not necessarily set up in this way to the above-mentioned communication link conditions — it can kick, and if it is **, there is not necessarily nothing. A system construction person can specify the set point of each register as arbitration.

[0065] Next, the 4th example adapting the configuration in the reader writer 2 is explained with reference to <u>drawing 7</u>. In this example, the communication link conditioning data storage memory 28 is prepared as an additional function.
[0066] In order to confirm the reader writer 2 to the wireless card 4 which is operating by the radical of some communication link conditions as shown above, it is necessary to set up each setting register of a step 3-STs 6 from MPU5. Although the register is accessed and set up according to an individual, respectively, now, processing occurs repeatedly and it becomes complicated.

[0067] So, in this example, the communication link conditioning data storage memory 10 which made these setting information memorize beforehand is prepared, and it specifies which [of memory information] MPU5 confirms. The MPUI/F circuit 22 sets up a communication link condition register automatically from the specified memory information.

[0068] Here, processing actuation of **** 4 example is explained with reference to the flow chart of $\frac{drawing \ 8}{drawing \ 8}$.

[0069] When a power source is switched on (ST11), the MPUI/F circuit 22 judges the initial communicate mode as a communications protocol with MPU5 (ST12).
[0070] According to assignment of which [of the memory information from MPU5] the MPUI/F circuit 22 confirms, memory information is called from the communication link conditioning data storage memory 28 (ST13). Decode the contents of this memory information (ST14), and the dividing value of the input-clock frequency divider 21 is set up based on this decoded communication link conditioning data (ST15). The transmitted carrier frequency of the transmitting carrier generation circuit 23 is set up (ST16), the received carrier frequency of the receiving carrier generation circuit 24

is set up (ST17), and the communication link baud rate of the communication link baud rate generation circuit 25 is set up (ST18).

[0071] And from MPU5, the MPUI/F circuit 22 sets up the other modes through serial communication (ST19), confirms all setup (ST20), and starts the communication link with the wireless card 4 (ST21).

[0072] <u>Drawing 9</u> is the example of a configuration of the memory information stored in the communication link conditioning data storage memory 28. For example, when a specification is in ISO10xxx mode, the address is set up with the 00th street and the function (register set point) is set up with input clocks 1/1, the transmitting carriers 1/16, and baud rates 1/32.

[0073] In the example of a configuration of this memory information, register setting information is arranged in the communication link conditioning data storage memory 28 for every functional specifications. When making it a setup corresponding to ISO10xxx mode, MPU5 can set up the reader writer 2 by [of the communication link conditioning data storage memory 28] confirming the 00th street.

[0074] <u>Drawing 10</u> is other examples of a configuration of the memory information stored in the communication link conditioning data storage memory 28. For example, in the case of input-clock:16MHz, transmitting carrier:125kHz, receiving carrier:62.5kHz, and communication link baud rate:7800bps, the address is set up with the 00th street and the function (register set point) is set up for the specification with input clocks 1/2, the transmitting carriers 1/64, the receiving carriers 1/128, and baud rates 1/64. [0075] In the example of a configuration of this memory information, register setting information is arranged in the communication link conditions. For example, by setting the communication link conditions shown by <u>drawing 4</u> as the 00th street of the communication link conditioning data storage memory 28, if the 00th street is confirmed, a setup of the reader writer 2 will become the thing corresponding to this storage memory 10 from MPU5.

[0076] Next, the 5th example is explained with reference to drawing 11.

[0077] The differences with <u>drawing 2</u> in **** 5 example are the transmission—control circuit 31 and the reception—control circuit 32.

[0078] The transmission-control circuit (modulation circuit) 31 is a circuit which generates the modulation data to the wireless card 4 with the transmitting carrier generated in the transmitting carrier generation circuit 23, the communication link baud rate generation circuit 25

and the transmit data from the MPUI/F circuit 22. Moreover, the existence of data processing is controllable by the data-processing control signal from the MPUI/F circuit 22 to transmit data.

[0079] Specifically, it is addition of 1 synchronous character data. At this time, the character value and character length of a synchronous character can specify it as arbitration from MPU5 separately.

[0080] 2) Addition of CRC operation data

[0081] 3) Addition of a frame start character / frame termination character. Addition of a frame start/termination character can be specified according to an individual. [0082] It has ******.

[0083] The reception-control circuit (demodulator circuit) 32 is a circuit which generates the recovery data to MPU5 with the received data from the wireless card 4, the receiving carrier generated in the receiving carrier generation circuit 24, and the communication link baud rate clock generated in the communication link baud rate generation circuit 25. Moreover, the existence of processing of data is controllable by the data-processing control signal from the MPUI/F circuit 22 to recovery data. [0084] Specifically, it is deletion of 1 synchronous character data. At this time, the character value and character length of a synchronous character can specify it as arbitration from MPU5 separately.

[0085] 2) CRC operation acknowledgement function (error detection function).

[0086] 3) Deletion of a frame start character / frame termination character. Deletion of a frame start/termination character can be specified according to an individual. [2027] It has starter.

[0087] It has *****.

[0088] <u>Drawing 12</u> is the example of transmit data processing by the data-processing control signal in the transmission-control circuit 31. The radical data shown in (a) of <u>drawing 12</u> are serial data transmitted from MPU5, and are these data which should be transmitted to the wireless card 4. Hereafter, six sorts of examples are shown and processing of the data to this radical data is explained. It is the example which is shown here to the last, and it is not what showed all realizable combination.

[0089] (b) shows the condition of the transmit data in the case of adding 1 byte of synchronous character. The synchronous character is added to the head of radical data. For example, the character of 92H is added.

[0090] (c) shows the condition of the transmit data in the case of adding 2 bytes of synchronous character. The synchronous character is added to the head of radical data. For example, the character of 9292H is added.

[0091] (d) shows the condition of the transmit data in the case of adding a CRC

operation. The CRC operation was performed to radical data and the result of an operation is added after the last data transmission of these data. For example, when calculating CRC16, the result of an operation is added to 16 bits.

[0092] (e) shows the condition of the transmit data in the case of adding an initiation frame (SOF) / termination frame (EOF) before and after radical data, respectively. For example, the "High level" of a triplet can be added from the "Low level" of 10 to 11 bits, and 2 as SOF. Moreover, the "Low level" of 10 to 11 bits can be added as EOF. [0093] (f) shows the condition of the transmit data in the case of adding an initiation frame (SOF) to the anterior part of radical data.

[0094] (g) shows the condition of the transmit data in the case of adding a termination frame (EOF) to the posterior part of radical data.

[0095] Processing of the recovery data based on the data-processing control signal in the reception-control circuit 32 performs the reverse of transmit data processing shown in (b) – (g) of <u>drawing 12</u>. For example, the recovery data which deleted only the synchronous character from the recovery data with which the synchronous character from the data with which the synchronous character was added to the head are generated, and it transmits as serial data to MPU5 (radical data are generated from the data of (b) of <u>drawing 12</u>).

[0096] As explained above, according to the gestalt of implementation of the above-mentioned invention, the general-purpose reader writer corresponding to a wireless card with various communication link conditions (an input-clock frequency, a received carrier frequency, a transmitted carrier frequency, transceiver communication link baud rate) is realizable.

[0097] Moreover, by using a reader writer widely, the need of manufacturing the reader writer system corresponding to each wireless card according to an individual is lost, and development effectiveness and the effectiveness of a maintenance improve. [0098] Moreover, a functional setting register can be performed through serial I/F of MPU, and since it has realized without adding an extraordinarily difficult function, it can master easily only by getting to know the fundamental operating instructions of MPU.

[0099] In addition, it becomes possible from MPU by storing information in memory also about each setting command about processing control of a transmitted and received data to set up automatically.

[Translation done.]

* NOTICES *

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 This document has been translated by computer. So the translation may not reflect the original precisely.

2.*** shows the word which can not be translated

3.In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] The block diagram showing the outline configuration of the wireless card processing system concerning this invention.

<u>Drawing 2</u> The block diagram showing the outline configuration of a reader writer.

Drawing 3] The flow chart for explaining actuation of a reader writer.

 $[\underline{\mathsf{Drawing}} \ 4]$ Drawing showing the configuration of the 1st concrete example in a eader writer.

<u>Drawing 5]</u> Drawing showing the configuration of the 2nd concrete example in a eader writer.

Drawing 6] Drawing showing the configuration of the 3rd concrete example in a reader writer.

[Drawing 7] Drawing showing the 4th example adapting the configuration in a reader writer.

<u>Drawing 8]</u> The flow chart for explaining processing actuation of a reader writer.

[Drawing 9] Drawing showing the example of a configuration of the memory information stored in communication link conditioning data storage memory.

[Drawing 10] Drawing showing the example of a configuration of memory **** stored in communication link conditioning data storage memory.

<u>[Drawing 11]</u> Drawing showing the configuration of the 5th example of a reader writer <u>[Drawing 12]</u> Drawing showing the example of transmit data processing by the data-processing control signal in a transmission-control circuit.

[Description of Notations]

- 1 -- High order equipment (PC)
- 2 Reader writer
- 4 -- Wireless card

- 5 -- MPU (controlling element)
- 6 LSI for wireless card reader writers
- 7 Transceiver circuit
- 21 Input-clock frequency divider (dividing means)
- 22 MPUI/F (setting means)
- 23 -- Transmitting carrier generation circuit (transmitting carrier generation means)
- 24 -- Receiving carrier generation circuit (receiving carrier generation means)
- 25 -- Communication link baud rate generation circuit (communication link baud rate generation means)
- 26 31 Transmission-control circuit (transmission-control means)
- 27 32 Reception-control circuit (reception-control means)
- 28 Communication link conditioning data storage memory (storage means)

[Translation done.]

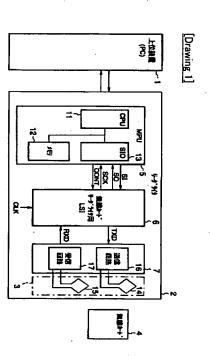
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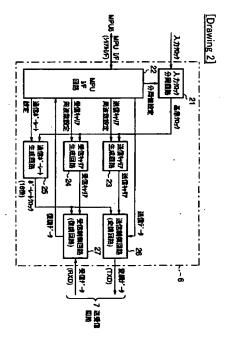
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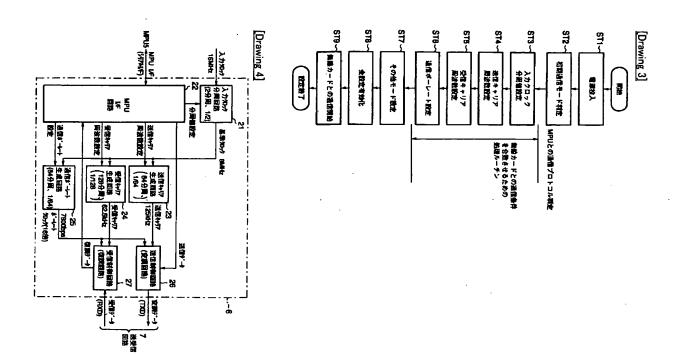
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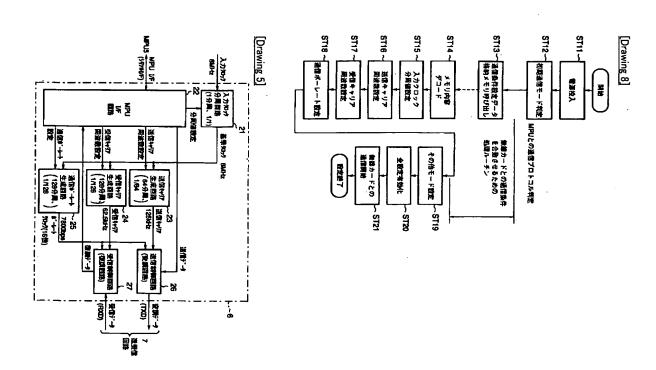
- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.*** shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

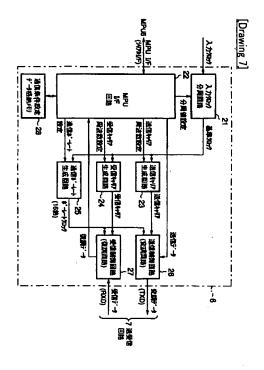
DRAWINGS

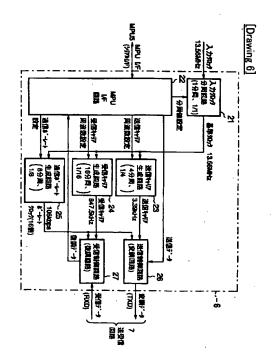








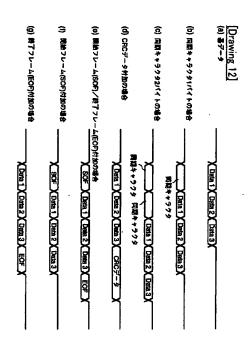


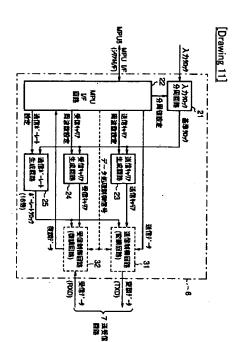


	入力クロック :13.56MHz 送信キャリア :3.39MHz 受信キャリア :847.564z 通信ボーレート:1064bps	入力クロック : 8MHz 送信キャリア : 1256Hz 受信キャリア : 82.56Hz 送信が-レート : 7800tpa	入力クロック :18MPz 送信キャリア :125kHz 受信キャリア :62.5kHz 送信ボーレート:7800bps	仕事	Drawing 10]
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[Translation done.]





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(19)日本国特許庁(JP)

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(11)特許出願公開番号

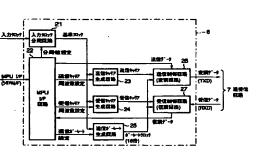
特期2001-126038

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38		株式会社東芝 株式会社東芝	禁火金			(1000 11 000)	W. & 11 & 10 H 20 H		(%) ## #
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デーマコート。(参考)	J.			_	F I		数 例記号		(51) Int Cl.?

(54) 「発用の名称」 リーダライタとリーダライタの通信条件設定方法

ック分周回路21の分周値を設定し、送信キャリア生成 ードし、このデコードした通信条件に基づいて入力クロ て通信条件情報を受信し、受信した通信条件情報をデコ せ、開発効率およびメンテナンスの効率を向上させる。 モードの判定を行い、MPU5よりシリアル通信を介し **報を受信し、その他のモードを設定し、全設定を有効に** 回路23の送信キャリア周波数字般定し、受信キャリア 22は、MPU5との通信プロトコルとしての初期通信 MPU5よりシリアル通信を介してその他のモードの信 ±成回路24の受信キャリア周波数を設定し、通信ボー) て無礙カードとの通信を開始する. /一下生成回路25の通信ボーフートを設定し、さらだ さまざまな通信条件に対応する汎用性を持/ 街頭が投入された際、MPUI/F回路



成手段で生成する受信キャリア周波数を上記受信キャリ 受信し、この受信した情報に基づいて上記分周手段で生 信キャリア周波数、通信ボーレートクロック値の情報を リアを生成する受信キャリア生成手段と、上記分周手段 する制御素子を有したリーダライタにおいて、外部から 受信キャリア周波数、通信ボーレートクロック値を決定 とするリーダライタ。 生成手段に制定する制定手段と、を具備したことを特徴 成する通信ボーレートクロック値を上記通信ボーレート 信キャリア生成手段で生成する送信キャリア周波数を上 成する基準クロック値を上記分周手段に設定し、上記送 で決定された基準クロック値、送信キャリア周波数、受 **クを生成する通信ボーレート生成手段と、上記制御素子** で生成された基準クロックにより通信ボーレートクロッ より送信キャリアを生成する送信キャリア生成手段と、 分周手段と、この分周手段で生成された基準クロックに 入力されるクロックを分周して基準クロックを生成する ア生成手段に設定し、上記通信ボーレート生成手段で生 紀送信キャリア生成手段に散定し、上紀受信キャリア生 上記分周手段で生成された基準クロックにより受信キャ 【請求項1】 基準クロック値、送信キャリア周波数

する設定手段と、を具備したことを特徴とするリーダラ 記受信キャリア周波数を生成する分周値を上記受信キャ ク値のシリアルデータを受信し、この受信したシリアル ア周波数、受信キャリア周波数、通信ボーレートクロッ 分周手段で生成された基準クロックを分周して通信ボー 分周して送信キャリアを生成する送信キャリア生成手段 分周手段と、この分周手段で生成された基準クロックを する制御菜子を有したリーダライタにおいて、外部から 受信キャリア周波数、通信ボーレートクロック値を決定 を生成する分周値を上記通信ボーレート生成手段に設定 リア生成手段に般定し、上記通信ボーレートクロック値 成する分周値を上記送信キャリア生成手段に設定し、上 を上記分周手段に設定し、上記送信キャリア周波数を生 受信キャリアを生成する受信キャリア生成手段と、上記 データを解読して上記基準クロック値を生成する分周値 上記制御素子で決定された基準クロック値、送信キャリ レートクロックを生成する通信ボーレート生成手段と、 入力されるクロックを分周して基準クロックを生成する 【請求項2】 ・基準クロック値、送信キャリア周波数、 上記分周手段で生成された基準クロックを分周して

基準クロックにより受信キャリアを生成する受信キャリ る送信キャリア生成手段と、上記分周手段で生成された で生成された基準クロックにより送信キャリアを生成す して基準クロックを生成する分周手段と、この分周手段 ダライタにおいて、外部から入力されるクロックを分周 限を指定して通信条件を決定する制御素子を有したリー 「請求項3】 複数の通信条件情報に付与された識別情

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成手段に散定し、上記通信ボーレート生成手段で生成す 信キャリア生成手段に散定し、上記受信キャリア生成手 ャリア生成手段で生成する送信キャリア周波数を上記没 る基準クロック値を上記分周手段に設定し、上記送信字 呼び出した通信条件情報としての上記分周手段で生成す された通信条件を指定する識別情報を受信し、この受信 報を予め記憶している記憶手段と、上記制御菜子で決定 通信条件情報に識別情報が付与された複数の通信条件情 受信キャリア周波数、通信ボーレートクロック値を含む により通信ボーレートクロックを生成する通信ボーレー ア生成手段と、上記分周手段で生成された基準クロック るリーダライタ。 手段に設定する設定手段と、を具備したことを特徴とす る通信ボーレートクロック値を上記通信ボーレート生成 段で生成する受信キャリア周波数を上記受信キャリア生 した鑑別情報を用いて上記記憶手段を検索し、検索して ト生成手段と、基準クロック値、送信キャリア周波数

の受信した識別僧報を用いて上記記憶手段を検索し、検 通信条件を予め記憶している記憶手段と、上記制御素子 生成する分周手段と、この分周手段で生成された基準ク 外部から入力されるクロックを分周して基準クロックを 報を決定する制御素子を有したリーダライタにおいて、 ダライタ。 受信キャリア生成手段に設定し、通信ボーレートクロッ 索して呼び出した通信条件情報としての基準クロック値 周値を含む通信条件情報に識別情報が付与された複数の ャリア周波数、通信ボーレートクロック値を生成する分 手段と、基準クロック値、送信キャリア周波数、受信キ 通信ボーレートクロックを生成する通信ボーレート生成 分周して受信キャリアを生成する受信キャリア生成手段 生成手段と、上紀分周手段で生成された基準クロックを ロックを分周して送信キャリアを生成する送信キャリア に設定し、受信キャリア周波数を生成する分周値を上記 ア周波数を生成する分周値を上記送信キャリア生成手段 を生成する分周値を上記分周手段に設定し、送信キャリ と、上紀分周手段で生成された基準クロックを分周して 設定する設定手段と、を具備したことを特徴とするリー ク値を生成する分周値を上記通信ボーレート生成手段に で決定された通信条件を指定する識別情報を受信し、 【請求項4】 複数の通信条件情報に付与された識別情

ន 周して基準クロックを生成する分周手段と、この分周手 段で生成された基準クロックにより送信キャリアを生成 する制御素子を有して、無線カードと無線通信を行うリ 受信キャリア周波数、通信ボーレートクロック値を決定 クにより通信ボーレートクロックを生成する通信ボーレ た基準クロックにより受信キャリアを生成する受信キャ する送信キャリア生成手段と、上記分周手段で生成され ーダライタにおいて、外部から入力されるクロックを分 リア生成手段と、上記分周手段で生成された基準クロッ 【請求項5】 墓準クロック値、送信キャリア周波数

ロック、上記無線カードから受信した受信データとから 通信ボーレート生成手段で生成される通信ボーレートク 受信キャリア生成手段で生成される受信キャリア、上記 御素子から送信される送信データとから変調データを生 成手段で生成される送信キャリア、上記通信ボーレート 手段と、この股定手段で股定された上記送信キャリア生 に拠定し、上記受信キャリア生成手段で生成する受信キ 成する送信キャリア周被数を上記送信キャリア生成手段 ート生成手段と、上配制御業子で決定された基準クロッ 夕値、送信キャリア周波数、受信キャリア周波数、通信 段に対して上記送信データに対するデータ加工を制御 復調データを生成する受信制御手段と、上記送信制御手 成する送信制御手段と、上紀散定手段で散定された上紀 生成手段で生成される通信ポーレートクロック、上記制 ロック値を上記通信ボーレート生成手段に散定する散定 紀通信ボーレート生成手段で生成する通信ボーレートク ャリア周波数を上紀受信キャリア生成手段に設定し、上 上記分周手段に設定し、上記送信キャリア生成手段で生 報に基づいて上記分周手段で生成する基準クロック値を ボーレートクロック値の情報を受信し、この受信した情 し、上記受信制御手段に対して上記復調データに対する データ加工を制御する制御手段と、を具備したことを特 5

【解泉項6】 上記制御手段で制御されるデータ加工は、同期キャラクタデータの付加・削除、CRC演算データの付加・削除、フレーム開始、フレーム終了キャラクタの付加・削除、及びこれらの組み合わせであることを特徴とする部泉頂も記載のリーダライタ。

する制御粜子を有したリーダライタの通信条件設定方法 受信キャリア周波数、通信ボーレートクロック値を決定 リア周被数を設定し、上記生成する通信ボーレートクロ いて上紀生成する基準クロック値を設定し、上記生成す 信キャリア周被数、受信キャリア周波数、通信ボーレー であって、外部から入力されるクロックを分周して基準 ック値を設定するステップと、からなることを特徴とす る送信キャリア周波数を設定し、上記生成する受信キャ トクロック値の情報を受信し、この受信した情報に基づ ップと、上記制御業子で決定された基準クロック値、送 クロックにより通信ボーレートクロックを生成するステ **クにより受信キャリアを生成するステップと、上記基準** クロックを生成するステップと、この基準クロックによ るリーダライタの通信条件設定方法。 【請求項7】 基準クロック値、送信キャリア周波数 送信キャリアを生成するステップと、上記基準クロッ ಜ

【翻求項8】 其準クロック値、送信キャリア周波数、受信キャリア周波数、通信ボーレートクロック値を決定受信キャリア周波数、通信ボーレートクロック値を決定する制御業子を有したリーダライタの通信条件設定方法であって、外部から入力されるクロックを分周して基準クロックを生成するステップと、この基準クロックを分別して送信キャリアを生成するステップと、上記基準ク 50 周して送信キャリアを生成するステップと、上記基準ク 50 に

ロックを分周して受信キャリアを生成するステップと、上記基準クロックを分周して通信ボーレートクロックを 生成するステップと、上記期御素子で決定された基準クロック値、送信キャリア周波敷、受信キャリア周波敷、通信ボーレートクロック値のシリアルデータを受信し、この受信したシリアるデータを解説して上記基準クロック値を生成する分周値を設定し、上記受信キャリア周波敷を生成する分周値を設定し、上記受信キャリア周波敷を生成する分周値を設定し、上記受信キャリア周波敷を生成する分周値を設定し、上記の信ボーレートクロック値を生成する分周値を設定し、大記通信ボーレートクロック値を生成する分周値を設定し、大記通信ボーレートクロック値を生成する分周値を設定するステップと、からなることを特徴とするリーグライタの通信条件設定方法。

送信キャリア周波数、受信キャリア周波数、通信ボーレ る識別情報を検索して通信条件情報を呼び出し、この通 ートクロックを生成するステップと、基準クロック値、 ステップと、上記基準クロックにより受信キャリアを生 ることを特徴とするリーダライタの通信条件般定方法。 生成する受信キャリア周波数を設定し、上記生成する通 受信し、この受信した識別情報を用いて上記記憶してい れた複数の通信条件情報を予め記憶するステップと、上 一トクロック値を含む通信条件情報に鑑別情報が付与さ 成するステップと、上記基準クロックにより通信ボーレ プと、この基準クロックにより送信キャリアを生成する ダライタの通信条件設定方法であって、外部から入力さ 報を指定して通信条件を決定する制御素子を有したリー **信ボーレートクロック値を設定するステップと、からな** 定し、上紀生成する送信キャリア周波数を設定し、上記 信条件情報に含まれる上記生成する基準クロック値を勘 紀制御菜子で決定された通信条件を指定する識別情報を れるクロックを分周して基準クロックを生成するステッ 【精求項9】 複数の通信条件情報に付与された識別情

8 ロックを分周して送信キャリアを生成するステップと、 テップと、上記基準クロックを分周して通信ボーレート ライタの通信条件設定方法。 別情報を受信し、この受信した識別情報を用いて上記記 クロック値を生成する分周値を含む通信条件情報に離別 周して基準クロックを生成するステップと、この基準ク 件設定方法であって、外部から入力されるクロックを分 僧報を決定する制御素子を有したリーダライタの通信条 設定するステップと、からなることを特徴とするリータ 設定し、通信ボーレートクロック値を生成する分周値を 周値を設定し、受信キャリア周波数を生成する分周値を する分周値を設定し、送信キャリア周波数を生成する分 し、この通信条作情報に含まれる基準クロック値を生成 億している識別情報を検索して通信条件情報を呼び出 プと、上記制御菜子で決定された通信条件を指定する簡 情報が付与された複数の通信条件を予め記憶するステッ キャリア周波数、受信キャリア周波数、通信ボーレート クロックを生成するステップと、基準クロック値、送信 上記基準クロックを分周して受信キャリアを生成するス 【請求項10】 複数の通信条件情報に付与された翻別

> 成するステップと、上記設定された受信キャリア周波数 準クロック値を設定し、上記生成する送信キャリア周波 受信キャリア周波数、通信ボーレートクロック値の情報 子で決定された基準クロック値、送信キャリア周波数、 ボーレートクロックを生成するステップと、上記制御募 成するステップと、上記基準クロックにより受信キャリ 決定する制御素子を有して、無線カードと無線通信を行 数、受信キャリア周波数、通信ボーレートクロック値を テップと、からなることを特徴とするリーダライタの通 で生成される受信キャリア、上記通信ボーレートクロッ 御来子から送信される送信データとから変調データを生 ロック値で生成される通信ボーレートクロック、上配制 される送信キャリア、上記散定された通信ボーレートク ステップと、上記設定された送信キャリア周波数で生成 数を散定し、上紀生成する受信キャリア周波数を設定 を受信し、この受信した情報に基づいて上記生成する基 ステップと、この基準クロックにより送信キャリアを生 入力されるクロックを分周して基準クロックを生成する 御し、上記復調データに対するデータ加工を制御するス るステップと、上記送信データに対するデータ加工を制 ードから受信した受信データとから復調データを生成す ク値で生成される通信ボーレートクロック、上記無線カ し、上紀生成する通信ボーレートクロック値を股定する アを生成するステップと、上記基準クロックにより通信 **うリーダライタの通信条件数定方法であって、外部から** 【精求項11】 基準クロック値、送信キャリア周波

【発明の詳細な説明】

信条件概定方法。

[0001]

【発明の属する技術分野】この発明は、上位装置と無線カードとの間でデータのやり取りを行い、これらとのインターフェースと全体を制御するMPリとからなるリーグライタとリーグライタの通信条件設定方法に関する。

【従来の技術】従来、無線カード用の無線カード処理システムは、ホスト(上位装置、PC)とリーダライタ(R/W)と無線カードとからなる。上記リーダライタは、ホスト(PC)と無線カードとを接続するものである。このリーダライタは、全体を制御するMPUとLS1からなるインターフェースと送受信回路とにより構成されている。

【0003】無線(1C)カードは、その種類層なにより様々な通信条件で動作している。これまでこれら無線カードとの通信を行うためのリーダライタは、無線カードの通信条件に合致した通信モードを持ったものを各々製作していた。従って、Aという通信条件を有した無線カードにはA.というリーダライタを、Bという通信条件を有した無線カードにはB.というリーダライタを用食する必要がある。

【0004】ここで言う通信条件とは、「受信キャリア

特輯2001−126038

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周放数」、「送信キャリア周波数」、「送受信通信ボーレート」のことである。 レート」のことである。 【0005】しかしながら、無線カードそれぞれの通信 条件に合わせてリーダライタを作ることは開発効率が大 変悪い。また、通信条件のみが異なるだけで、その他の 機能が全く同等のリーダライタを無線カードの種類分だ

[0006]

るという問題があった。

びメンテナンス面では大変な労力が発生し効率が悪くな

け作り込むことは技術的には問題無いが、開発効率およ

【発明が解決しようとする課題】上記したように、無線カードそれぞれの適信条件に合わせてリーダライタを作ることは開発効率が大変更く、通信条件のみが異なるだけで、その他の機能が全く同等のリーダライタを無験カードの種類分だけ作り込むことは技術的には問題無いが、開発効率およびメンテナンス面では大変な労力が発生し効率が悪くなるという問題があった。

に対応する汎用性を持たせ、開発効率およびメンテナンスの効率を向上させることのできるリーダライタとリーダライタの通信条件配定方法を提供することを目的とす

80001

ャリア生成手段に設定し、上記受信キャリア生成手段で 手段で生成された基準クロックにより受信キャリアを生 ア周波数、通信ボーレートクロック値を決定する制御素 は、基準クロック値、送信キャリア周波数、受信キャリ に設定する設定手段とから構成されている。 信ポーレートクロック値を上記通信ポーレート生成手段 段に設定し、上記通信ボーレート生成手段で生成する通 生成する受信キャリア周波数を上記受信キャリア生成手 ア生成手段で生成する送信キャリア周波数を上記送信キ 準クロック値を上記分周手段に設定し、上記送信キャリ この受信した情報に基づいて上記分周手段で生成する基 ア周波数、通信ボーレートクロック値の情報を受信し、 れた基準クロック値、送信キャリア周波数、受信キャリ する通信ボーレート生成手段と、上記制御素子で決定さ れた基準クロックにより通信ボーレートクロックを生成 成する受信キャリア生成手段と、上記分周手段で生成さ キャリアを生成する送信キャリア生成手段と、上配分周 と、この分周手段で生成された基準クロックにより送信 子を有したリーダライタにおいて、外部から入力される クロックを分周して基準クロックを生成する分周手段 【麒題を解決するための手段】この発明のリーダライタ

【0009】この発明のリーダライタは、基準クロッカ値、送信キャリア周波数、受信キャリア周波数、通信ボーレートクロッカ値を決定する制御業子を有したリーダライタにおいて、外部から入力されるクロックを分周して基準クロックを生成する分周手段と、この分周手段での、生成された基準クロックを分周して送信キャリアを生成

別情報を受信し、この受信した識別情報を用いて上記記 分周手段と、この分周手段で生成された基準クロックに 値を上記通信ボーレート生成手段に設定する設定手段と ボーレート生成手段で生成する通信ボーレートクロック 段と、上記制御素子で決定された通信条件を指定する識 与された複数の通信条件情報を予め記憶している記憶手 顔、送信キャリア周波数、受信キャリア周波数、通信ボ クを生成する通信ボーレート生成手段と、基準クロック リアを生成する受信キャリア生成手段と、上記分周手段 より送信キャリアを生成する送信キャリア生成手段と、 件情報に付与された識別情報を指定して通信条件を決定 から構成されている。 周波数を上記受信キャリア生成手段に設定し、上記通信 手段に設定し、上記送信キャリア生成手段で生成する送 ての上記分周手段で生成する基準クロック値を上記分周 億手段を検索し、検索して呼び出した通信条件情報とし で生成された基準クロックにより通信ボーレートクロッ 上紀分周手段で生成された基準クロックにより受信キャ 入力されるクロックを分周して基準クロックを生成する する制御素子を有したリーダライタにおいて、外部から **雷キャリア周波数を上記送信キャリア生成手段に根定** し、上紀受信キャリア生成手段で生成する受信キャリア 【0010】この発明のリーダライタは、複数の通信条 レートクロック値を含む通信条件情報に識別情報が付

する受信キャリア生成手段と、上記分周手段で生成され アを生成する送信キャリア生成手段と、上記分周手段で 周手段で生成された基準クロックを分周して送信キャリ を分周して基準クロックを生成する分周手段と、この分 たリーダライタにおいて、外部から入力されるクロック 件情報に付与された識別情報を決定する制御素子を有し 信キャリア周波数、受信キャリア周波数、通信ボーレー 成する通信ボーレート生成手段と、基準クロック値、送 た基準クロックを分周して通信ボーレートクロックを生 生成された基準クロックを分周して受信キャリアを生成 【0011】この発明のリーダライタは、複数の通信条 5

手段とから構成されている。

数を生成する分周値を上記受信キャリア生成手段に設定 する識別情報を受信し、この受信した識別情報を用いて 別情報が付与された複数の通信条件を予め記憶している されている。 し、通信ボーレートクロック値を生成する分周値を上記 手段に紀定し、送信キャリア周波数を生成する分周値を 報としての基準クロック値を生成する分周値を上記分周 紀億手段と、上記制御素子で決定された通信条件を指定 トクロック値を生成する分周値を含む通信条件情報に翻 通信ポーレート生成手段に散定する散定手段とから構成 上記記憶手段を検索し、検索して呼び出した通信条件情 上記送信キャリア生成手段に設定し、受信キャリア周波

値、送信キャリア周波数、受信キャリア周波数、通信ボ キャリアを生成する受信キャリア生成手段と、上記分周 により送信キャリアを生成する送信キャリア生成手段 る分周手段と、この分周手段で生成された基準クロック **ら入力されるクロックを分周して基準クロックを生成す** カードと無線通信を行うリーダライタにおいて、外部か ーレートクロック値を決定する制御粜子を有して、無続 と、上紀分周手段で生成された基準クロックにより受信 【0012】この発明のリーダライタは、基準クロック

ロックを生成する通信ボーレート生成手段と、上記制御

素子で決定された基準クロック値、送信キャリア周波

手段で生成された基準クロックにより通信ボーレートク

情報を受信し、この受信した情報に基づいて上記分周手 で生成される通信ボーレートクロック、上記無線カード 信データとから変調データを生成する送信制御手段と 設定された上紀送信キャリア生成手段で生成される送信 レート生成手段に設定する設定手段と、この設定手段で 段で生成する通信ボーレートクロック値を上記通信ボー リア生成手段で生成する受信キャリア周波数を上記受信 数を上記送信キャリア生成手段に数定し、上記受信キャ 段で生成する基準クロック値を上記分周手段に設定し、 数、受信キャリア周波数、通信ボーレートクロック値の して上記復調データに対するデータ加工を制御する制御 タに対するデータ加工を制御し、上記受信制御手段に対 信制御手段と、上記送信制御手段に対して上記送信デー から受信した受信データとから復調データを生成する受 生成される受信キャリア、上記通信ボーレート生成手段 上記設定手段で設定された上記受信キャリア生成手段で 信ボーレートクロック、上記制御素子から送信される送 キャリア、上記通信ボーレート生成手段で生成される通 キャリア生成手段に設定し、上記通信ボーレート生成手 上記送信キャリア生成手段で生成する送信キャリア周級

て、外部から入力されるクロックを分周して基準クロッ リア周波数、通信ボーレートクロック値を決定する制御 素子を有したリーダライタの通信条件設定方法であっ 法は、基準クロック値、送信キャリア周波数、受信キャ 【0013】この発明のリーダライタの通信条件設定方

> ロック値の情報を受信し、この受信した情報に基づいて 値を設定するステップとからなることを特徴とする。 周波数を設定し、上記生成する通信ボーレートクロック 信キャリア周波数を設定し、上記生成する受信キャリア り受信キャリアを生成するステップと、上記基準クロッ キャリアを生成するステップと、上記基準クロックによ ャリア周波数、受信キャリア周波数、通信ボーレートク と、上記制御菜子で決定された基準クロック値、送信キ 上記生成する基準クロック値を設定し、上記生成する送 クにより通信ボーレートクロックを生成するステップ **クを生成するステップと、この基準クロックにより送信**

準クロックを分周して通信ボーレートクロックを生成す を分周して受信キャリアを生成するステップと、上記基 送信キャリアを生成するステップと、上記基準クロック 法は、基準クロック値、送信キャリア周波数、受信キャ 成する分周値を設定し、上記受信キャリア周波数を生成 生成する分周値を設定し、上紀送信キャリア周波数を生 信したシリアるデータを解読して上記基準クロック値を ーレートクロック値のシリアルデータを受信し、この受 値、送信キャリア周波数、受信キャリア周波数、通信が るステップと、上記制御素子で決定された基準クロック 素子を有したリーダライタの通信条件設定方法であっ リア周波数、通信ボーレートクロック値を決定する制御 生成する分周値を設定するステップとからなることを特 する分周値を散定し、上記通信ボーレートクロック値を りを生成するステップと、この墓準クロックを分周して て、外部から入力されるクロックを分周して基準クロッ 【0014】この発明のリーダライタの通信条件設定方

紀生成する送信キャリア周波数を設定し、上記生成する 報に含まれる上記生成する基準クロック値を設定し、上 この受信した識別情報を用いて上記記憶している識別情 の通信条件情報を予め記憶するステップと、上記制御素 ック値を含む通信条件情報に識別情報が付与された複数 リア周波数、受信キャリア周波数、通信ボーレートクロ ックを生成するステップと、基準クロック値、送信キャ テップと、上記基準クロックにより通信ポーレートクロ と、上記基準クロックにより受信キャリアを生成するス の基準クロックにより送信キャリアを生成するステップ ックを分周して基準クロックを生成するステップと、こ の通信条件設定方法であって、外部から入力されるクロ 法は、複数の通信条件情報に付与された難別情報を指定 受信キャリア周波数を設定し、上記生成する通信ボーレ 報を検索して通信条件情報を呼び出し、この通信条件情 子で決定された通信条件を指定する識別情報を受信し、 して通信条件を決定する制御素子を有したリーダライタ ートクロック値を設定するステップとからなることを特 【0015】この発明のリーダライタの通信条件制定方

【0016】この発明のリーダライタの通信条件設定方

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を生成する分周値を含む通信条件情報に識別情報が付与 生成するステップと、基準クロック値、送信キャリア周 法は、複数の通信条件情報に付与された識別情報を決定 条作情報に含まれる基準クロック値を生成する分周値を された複数の通信条件を予め記憶するステップと、上記 ロックを分周して受信キャリアを生成するステップと、 周して送信キャリアを生成するステップと、上記基準ク する制御案子を有したリーダライタの通信条件設定方法 信ボーレートクロック値を生成する分周値を設定するス 信し、この受信した識別情報を用いて上記記憶している 制御素子で決定された通信条件を指定する識別情報を受 波数、受信キャリア周波数、通信ボーレートクロック値 であって、外部から入力されるクロックを分周して基準 テップとからなることを特徴とする。 設定し、送信キャリア周波数を生成する分周値を設定 識別情報を検索して通信条件情報を呼び出し、この通信 上記基準クロックを分周して通信ボーレートクロックを クロックを生成するステップと、この基準クロックを分 受信キャリア周波数を生成する分周値を設定し、通

ಆ た基準クロック値、送信キャリア周波数、受信キャリア ロックを生成するステップと、上記制御素子で決定され 信キャリア、上記通信ボーレートクロック値で生成され と、上記観定された受信キャリア周波数で生成される受 される送信データとから変調データを生成するステップ される通信ボーレートクロック、上記制御案子から送信 リア、上記観定された通信ボーレートクロック値で生成 記散定された送信キャリア周波数で生成される送信キャ る通信ボーレートクロック値を散定するステップと、上 を設定し、上記生成する送信キャリア周波数を設定し、 の受信した情報に基づいて上記生成する基準クロック値 **周波数、通信ボーレートクロック値の情報を受信し、こ** ステップと、上記基準クロックにより通信ボーレートク プと、上記基準クロックにより受信キャリアを生成する この基準クロックにより送信キャリアを生成するステッ ロックを分周して基準クロックを生成するステップと、 タの通信条件設定方法であって、外部から入力されるク 素子を有して、無線カードと無線通信を行うリーダライ リア周波数、通信ボーレートクロック値を決定する制御 法は、基準クロック値、送信キャリア周波数、受信キャ 【0017】この発明のリーダライタの通信条件設定方 ることを特徴とする。 データに対するデータ加工を制御するステップとからな 上記送信データに対するデータ加工を制御し、上記復開 た受信データとから復調データを生成するステップと る通信ボーレートクロック、上記無線カードやの受信し 上配生成する受信キャリア周波数を設定し、上記生成す

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ついて図画を参照して説明する。 【発明の実施の形態】以下、この発明の一実施の形態で

క 【0019】図1は、この発明に係わる無線カード処理

ジステムの概略構成を示すものである。
【0020】すなわち、無線カード処理システムは、上位装置としてのバーソナルコンピュータ(PC)1と、このPC1に接続されるリーダライタ(R/W)2とこのリーダライタ2のアンデナ部3との固で無線通信を行う無線(IC)カードイ、…とにより構成されている。【0021】PC1は、図示しない制御部、操作部、表示部、リーダライタ2の接続部により構成されている。【0022】リーダライタ2の接続部により構成されている。【0022】リーダライタ2の接続部により構成されている。【0022】リーダライタ2の接続部により構成されている。【0022】リーダライタ1、アンテナ部3、及び入力クロック分周回路21とにより構成されている。

【0023】MPU5は、MPU5の全体を制御するCPU11、制御プログラム、各種情報を記憶し、RAM、ROMからなるメモリ12、LS16との通信用のシリアルデータのインプット、アウトプット用のS1013により构成されている。

【0024】CPUIIは、上記PCIに接続され、データのやり取りが行われるものであり、たとえばデータ 20リードコマンドの受信に対して、LSI6にデータリードコマンドの送信を行うようになっている。 【0025】上記SI0I3には、シリアルインプットデータ(SI)用のI/Oボート、シリアルアウトブッ

データ(S 1)用の1/0ポート、シリアルアウトブットデータ(S 0)用の1/0ポート、シリアルクロック(S C K)用の1/0ポート、コントロール信号(C 0 N T)用の1/0ポート、コントロール信号(C 0 N T)用の1/0ポートが懸むられている。

【0026】上記S1013は、原袋カード4のデータリードコマンドをS1用の1~0ボートからしS16へ出力するものである。

【0027】アンテナ部3は、送信アンテナ14、受信 アンテナ15により構成されている。

【0028】上記送受信回路7は、送信回路16、受信回路17により物成されている。

【0029】無線カード4は、全体を制御する制御回路、制御プログラム、私数、1D(認識番号)データ等の各種情報を記憶するメモリ、変類復興回路、電源発生回路、送受信アンテナにより構成されている。

【0030】図2は、LS16の環路構成を示すものである。LS16は、入力クロック分周回路21、MPU・1/F22、送信キャリア生成回路23、受信キャリア生成回路24、通信ボーレート生成回路25、送信制御回路(変調回路)26、及び受信制領回路(復興回路)27とから構成されている。

【0031】入力クロック分周回路21は、リーダライタ2に入力される外部クロックを分周し、システムの基準となるクロックを生成するものである。例えば、1/1,1/1.5,1/2,1/4等の分周値を設けることにより、本発明による汎用リーダライタの機能をより、汎用性のあるものにすることが出来る。

【0032】MPUI/下回路22は、上配入力クロック分周回路21、送信キャリア生成回路23、受信キャリア生成回路23、受信キャリア生成回路23、受信キャリア生成回路25の各レジスタの股定をMPU5のシリアル端子を介してソフトウェアにて自動的に行うためのインターフェース(1/F)回路である。MPU5からのシリアルデータを受信・デコードすることにより、上記入力クロック分周回路21、送信キャリア生成回路23、受信キャリア生成回路21、送信キャリア生成回路25の各レジスタの股定を行う。

【0033】送信キャリア生成回路23は、入力クロック分周回路21で生成された基準クロックより、無線カード4への送信キャリア周波数を設定するためのものである。基準クロックを任意の値に分周することにより実ほする。

【0034】受信キャリア生成回路24は、入力クロック分周回路21で生成された基準クロックより、無線カード4からの受信データの受信キャリア周波数を設定するためのものである。基準クロックを任意の値に分周することにより実現する。

【0035】通信ボーレート生成回路25は、入力クロック分周回路21で生成された基準クロックより、無線カード4との通信ボーレートクロック(ボーレートの16倍の周波数)を設定するためのものである。基準クロックを任意の値に分別することにより実現する。

【0036】送信制御回路26は、送信キャリア生成回路23で生成された送信キャリアと、通信ボーレート生成回路25で生成された送信キャリアと、通信ボーレートクロックと、MPU1/下回路22からの送信データにより、無観カード4への変調データを生成する回路である。

【0037】受信制御回路27は、無線カード4からの受信データと、受信キャリア生成回路24で生成された受信キャリアと、通信ボーレート生成回路25で生成された通信ボーレートクロックにより、MPU5への復調データを生成する回路である。

【0038】次に、このような構成において、リーダライタ2の動作を図3のフローチャートを参照して説明する

【0039】電源が投入された際(ST1)、MPUI ✓F回路22は、MPU5との通信プロトコルとしての 初期通信モードの判定を行う(ST2)。

【0040】この判定に従ってMPUI/F回路22は、MPU5よりシリアル通信を介して通信条件情報を受信し、受信した通信条件情報をデコードし、このデコードした通信条件は基づいて入力クロック分周回路21の分周値を設定し(ST3)、送信キャリア生成回路23の送信キャリア周波数を設定し(ST4)、受信キャリア生成回路24の受信キャリア国波数を設定し(ST5)、通信ボーレート生成回路25の通信ボーレートを設定する(ST6)。

【0041】そして、MPUI/F回路22は、MPU 5よりシリアル通信を介してその他のモードの情報を受信し、その他のモードを既定し(ST7)、全既定を有物にし(ST8)、無線カード4との通信を開始する(ST22)。

より、無線カード4との通信条件が既定される。ただし、この既定順は問わない。これら既定は、MPU5のシリアル1/Fを用いてMPU5のメモリ12に記憶されているソフトウェアにより電源投入後、自動的に行われる。

【0042】上述したステップST3~6のルーチンに

【0043】次に、リーダライタ2における具体的に構成した第1実態例を図4を参照して説明する。下記の通信条件で動作する無線カード4との通信を可能とするためのリーダライタ2の設定は次のようになる。

【0044】通信条件 入力クロック周波数:16MHz 送信キャリア周波数:125kHz 受信キャリア周波数:62.5kHz 通信ボーレート:7800bps

MPU1/F回路22は、図3で示したフローにのっとりリーダライタ2の設定を行う。まず、MPU5は、ステップST3~6での各レジスタを設定するに当たり、予めどのような値を設定するかを決める。

【0045】続いて、MPU1/F回路22は、ここで決定した値をMPU5よりシリアル通信を介して受信し、入力クロック分周回路21、送信キャリア生成回路23、受信キャリア生成回路24、通信ボーレート生成回路25の各レジスタに対して設定する。

【0046】ここでの通信条件に対する各レジスタの股 30 定は以下のようになる。

【0047】a. 入力クロック分周回路21の入力クロック分周値を1~2に設定し、入力クロック(16MHz)から、リーダライタ2の動作の基本となる基準クロック(8MHz)を生成する。

【0048】b. 入力クロック分周回路21で生成された基準クロックに対しての送信キャリア周波数(125kHz)を生成するため、送信キャリア生成回路23の分周値を1/64に設定する。

【0049】c. 入力クロック分周回路21で生成された基準クロックに対しての受信キャリア周波数(62.5 kHz)を生成するために、受信キャリア生成回路24の分周値を1~128に設定する。

【0050】d. 入力クロック分周回路21で生成された基準クロックに対しての通信ボーレート(7800bps)を設定するために、通信ボーレート生成回路25の分周値を1/64に設定する。ここで生成されるクロックは、ボーレートの16倍の周波数である。

【0051】このように脱定することにより、上記通信 条件を備えた無線カード4との通信が可能となる。ただ

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し、a, b, c, dの設定類は問わない。また、ここで示した各レジスタの設定値(分周値)は一例であり、上配通信条件に対して必ずしもこのように設定しなければならないというわけではない。各レジスタの設定値はジステム配定者が任意に指定できる。

した通信条件に対して、入力クロックを8MHzに変更し、その他の条件は図4に同じである。 し、その他の条件は図4に同じである。 【0053】MPU1/F回路22は、図3で示したフローにのっとりリーダライタ2の設定を行う。

成した第2実施例を図5を参照して説明する。図4で示

【0054】a. 入力クロック分周回路21の入力クロック分周値を1/1に設定し、入力クロック(8MHz)から、リーダライタ2の動作の基本となる基準クロック(8MHz)を生成する。なお、b. 送信キャリア生成回路23の分周値、d. 通信ボーレート生成回路25の分周値には図4と同じである。

【0055】このように肥定することにより、上配通信条件を備えた無線カード4との通信が可能となる。ただし、上記a, b, c, dの設定順は問わない。また、ここで示した各レジスタの設定値(分周値)は一例であり、上配通信条件に対して必ずしもこのように設定しなければならないというわけではない。各レジスタの設定ければならないというわけではない。各レジスタの設定ははシステム設定者が任意に指定できる。
【0056】次に、リーダライタ2における具体的に模点した第3事権例を図6を参照して説明する。下記通信点した第3事権例を図6を参照して説明する。下記通信点した第3事権例を図6を参照して説明する。下記通信点した第3事権例を図6を参照して説明する。下記通信点に表現を構造した。

【0056】次に、リーダライタ2における具体的に構成した第3実施例を図6を参照して説明する。下配通信条件で動作する無線カード4との通信を可能とするためのリーダライタ2の設定は次のようになる。

【0057】通信条件

入力タロック周波数:13.56MHz 送信キャリア周波数:3.322MHz 受信キャリア周波数:847.5kHz 通信ボーレート:106kbps

MPUII/F回路22は、図3で示したフローにのっとりリーダライタ2の設定を行う。まず、MPU5は、ステップST3~6での各レジスタを設定するに当たり、予めどのような値を設定するかを決める。

【0058】続いて、MPU1/F回路22は、ここで決定した値をMPU5よりシリアル通信を介して受信し、入力クロック分周回路21、送信キャリア生成回路23、受信キャリア生成回路24、通信ボーレート生成回路25の各レジスタに対して設定する。

【0059】ここでの通信条件に対する各レジスタの設 定は以下のようになる。

【0060】a. 入力クロック分周回路21の入力クロック分周値を1~1に設定し、入力クロック(13.56MHz)から、リーダライタの動作の基本となる基準クロック(13.56MHz)を生成する。

50 【0061】b. 入力クロック分周回路21で生成され

た基準クロックに対しての送信キャリア周波数 (3.3 22MHz) を生成するために、送信キャリア生成回路 23の分周額を1/4に概定する。

【0062】c. 入力クロック分周回路21で生成された基準クロックに対しての受信キャリア周波数(847.5kHz)を生成するために、受信キャリア生成回路24の分別値を1、16に設定する。

【0063】d. 入力クロック分周回路21で生成された原物クロックに対しての通信ボーレート(106kbps)を販定するために、通信ボーレート生成回路25 10の分周値を1/8に設定する。ここで生成するクロックの分周値を1/8に設定する。ここで生成するクロックは、ボーレートの16倍の関波数である。

【0064】このように概定することにより、上記通信条件を備えた無線カード4との通信が可能となる。ただし、a.b,c,dの設定顧は問わない。また、ここで示した各レジスタの設定値(分周値)は一例であり、上記通信条件に対して必ずしもこのように設定しなければならないというわけではない。各レジスタの設定値はジステム認定者が任意に招定できる。

【0065】次に、リーダライタ2における構成を応用 50 した第4実施例を図7を参照して彫明する。本実施例では、追加機能として通信条件設定データ格納メモリ28を用食する。

【0066】上配に示した通り、ある通信条件の基で動作している無線カード4に対してリーダライタ2を有効作している無線カード4に対してリーダライタ2を有効とするために、ステップST3~6の各限定レジスタをMPU5より般定する必要がある。それぞれ個別にレジスタをアクセスして設定しているが、これでは何度も処理が発生し煩徭となる。

【0068】ここで、本第4実施例の処理動作を図8のプローチャートを参照して説明する。

【0069】電源が投入された際(STI1)、MPUL/F回路22は、MPU5との通信プロトコルとしての初期通信モードの判定を行う(ST12)。

【0070】MPUI/ド回路22は、MPU5からの 40メモリ情報のどれを有効にするかの指定に従って通信条件設定データ格納メモリ28からメモリ情報を呼び出し(ST13)、このメモリ情報の内容をデコードし(ST14)、このデコードした通信条件設定データに基づいて入力クロック分隔回路21の分周値を設定し(ST15)、送信キャリア生成回路23の送信キャリア周波数を設定し(ST16)、受信キャリア上域回路24の受信キャリア周波数を設定し(ST17)、通信ボーレート生成回路25の通信ボーレートを設定する(ST16)。

【0071】そして、MPUI/F回路22は、MPU5よりシリアル通信を介してその他のモードを設定し(ST19)、全般定を有効にし(ST20)、無線カビーではよっては、

ード4との通信を開始する(ST21)。 【0072】図9は、通信条件設定データ格件メモリ2 8に格許するメモリ情報の構成例である。例えば、仕様が1S010×××モードの場合、アドレスが00番地、機能(レジスタ設定値)が入力クロック1/1、送信キャリア1/1、受信キャリア1/1、受信キャリア1/16、ボーレート1/32と設定されている。

【0073】このメモリ情報の構成例では、機能仕様ごとに適信条件既定データ格納メモリ28内にレジスタ股とに適信条件既定データ格納メモリ28内にレジスタ股に情報を配置しておく。18010×××モードに合致した設定にするとき、MPU5は、通信条件設定データ格納メモリ28の00番地を有効にする事により、リーダライタ2の限定をすることが出来る。

【0074】図10は、通信条件設定データ格納メモ!

28に格納するメモリ情報の他の緯成例である。例えば、仕様が、入力クロック:16MHz、送信キャリア:125kHz、受信キャリア:62.5kHz、通信ボーレート:7800bpsの場合、アドレスが00番地、機能(レジスタ設定値)が入力クロック1/2、送信キャリア1/64、受信キャリア1/64と設定されている。

【0075】このメモリ情報の構成例では、適信条件ごとに通信条件設定データ格割メモリ28内にレジスタ設は情報を配置しておく。例えば、図4で示した適信条件を通信条件設定データ格割メモリ28の00番地に設定しておくことにより、MPU5より通信条件設定データ格割メモリ10の00番地を有効にすると、リーダライを割ったことにより、MPU5より通信条件設定データ格割メモリ10の00番地を有効にすると、リーダライタ2の設定がこの通信条件に合致したものになる。

【0076】次に、第5実施例を図11を参照して説明 オス

【0077】本第5実施例における図2との相違点は、 送信制御回路31と受信制御回路32である。

【0078】送信制御回路(変調回路)31は、送信キャリア生成回路23で生成された送信キャリアと、通信ボーレート生成回路25で生成された通信ボーレートクロックと、MPUI/F回路22からの送信データとにより、無線カード4への変調データを生成する回路である。また、MPUI/F回路22よりのデータ処理制御のまる。

【0079】具体的には、

1)同期キャラクタデータの付加。このとき同期キャラクタのキャラクタ値およびキャラクタ長は別途MPU5より任敵に指定できる。

【0080】2)CRC演算データの付加。

【0081】3)フレーム開始キャラカタ/フレーム終 了キャラカタの付加。フレーム開始/終了キャラカタの

付加は個別に指定できる。 【0082】の機能を擁する。

【0083】受信制御回路(復興回路)32は、無線カード4からの受信データと、受信キャリア生成回路24で生成された受信キャリアと、通信ボーレート生成回路25で生成された通信ボーレートクロックにより、MPU5への復興データを生成する回路である。また、MPU1/F回路22よりのデータ処理制御信号により、復興データに対してデータの加工の有無を制御できる。

【0084】具体的には、

1)同期キャラクタデータの別除。このとき同期キャラクタのキャラクタ値およびキャラクタ長は別途MLD クタのキャラクタ値およびキャラクタ長は別途MLD より任意に指定できる。

【0085】2)CRC演算確認機能(エラー検出機 だ)

【0086】3)フレーム開始キャラクタ/フレーム終了キャラクタの影際。フレーム開始/終了キャラクタの影際。フレーム開始/終了キャラクタの影除は個別に指定できる。

[0087]の機能を擁する。

【0088】図12は、送信制御回路31におけるデータ処理制御信号による送信データ加工の具体例である。図12の(a)に示す基データとは、MPU5から送信されるシリアルデータであり、無線カード4に送信すべき本データである。以下、この基データに対するデータの加工を6種の具体例を示して説明する。ここで示されるものはあくまでも具体例であり、実現できる組み合わせをすべて示したものではない。

【0089】(b)は、同期キャラクタを1パイト付加する場合の送信データの状態を示す。基データの先頭に対して、同期キャラクタを付加している。例えば、92円のキャラクタを付加する。

【0090】(c)は、同期キャラクタを2パイト付加する場合の送信データの状態を示す。基データの先頭に対して、同期キャラクタを付加している。例えば、9292Hのキャラクタを付加する。
【0091】(d)は、CRC演算を付加する場合の送信データの状態を示す。基データに対してCRC演算を実行し、その演算結果を本データの最終データ送信後に付加している。例えば、CRC16の演算をする場合

【0092】(e)は、基データの前後にそれぞれ開始フレーム(SOF)/探了フレーム(EOF)を付加する場合の送信データの状態を示す。例えば、SOFとして10から11ピットの"Lowレベル"と2から3ピットの"Highレベル"を付加することが出来る。また、EOFとして10から11ピットの"Lowレベル"を付加することが出来る。

【0093】(f)は、基データの前部に開始フレーム(SOF)を付加する場合の送信データの状態を示す。 【0094】(g)は、基データの後部に終了フレーム

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18 (EOF)を付加する場合の送信データの状態を示す。

【0095】受信制御回路32におけるデータ処理制御

信号による復期データの加工は、図12の(b)~ (g) に示す送信データ加工の逆を行う。例えば、先頭 (g) に示す送信データ加工の逆を行う。例えば、先頭 に同期キャラクタの付加された復調データから同期キャラクタのみを削除した復調データを生成し、MPU 5に 対してシリアルデータとして送信する(図12の(b)のデータから基データを生成する)。

【0096】以上説明したように上配発明の実施の形態によれば、様々な通信条件(入力クロック周波敷、受信キャリア周波敷、送侵信通信ボーキャリア周波敷、送侵信通信ボーレート)を持つ無線カードに対応した汎用リーダライタを実現することが出来る。

【0097】また、リーダライタを汎用化することにより、それぞれの無線カードに対応したリーダライタシステムを個別に製作する必要が無くなり、開発効率、メンテナンスの効率が向上する。

【0098】また、機能既定レジスタをMPUのシリアル1/Fを介して行うことが出来、特別難しい機能を付加することなしに実現しているため、MPUの基本的な操作方法を知るだけで容易に使いこなせることが出来る。

【0099】なお、送受信データの加工制御に関する各数だコマンドについてもメモリ内に倍級を格納しておくことによりMPUより自動的に配定することが可能となる。

[0000]

【発明の効果】以上詳述したようにこの発明によれば、さまざまな通信条件に対応する汎用性を持たせ、開発効率およびメンテナンスの効率を向上させることのできるリーダライタとリーダライタの通信条件設定方法を提供することができる。

【図面の簡単な説明】

【図1】この発明に係わる無線カード処理システムの概略構成を示す構成図。

【図2】リーダライタの興略構成を示すプロック図。 【図3】リーダライタの動作を説明するためのフローチャート。

【図4】リーダライタにおける具体的な第1実施例の構成を示す図。

は、16ピットに演算結果が付加される。

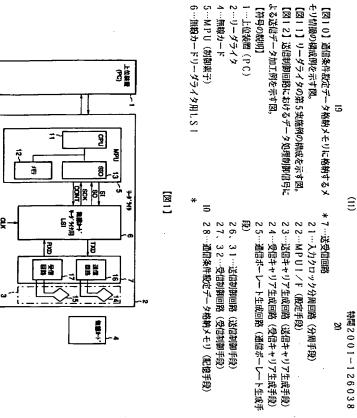
【図5】リーダライタにおける具体的な第2実施例の開 成を示す図。

【図6】リーダライタにおける具体的な第3実施例の構成を示す図。

【図7】リーダライタにおける構成を応用した第4実施例を示す図。

【図8】リーダライタの処理動作を説明するためのフローチャート。

【図9】通信条件設定データ格納メモリに格納するメモ50 リ情報の構成例を示す図。



[図3]

·[88]

MPUとの連合プロトコル共列

製造カードとの通信条件 を合数させるための 処理ホーチン

無数カードとの 単位更形

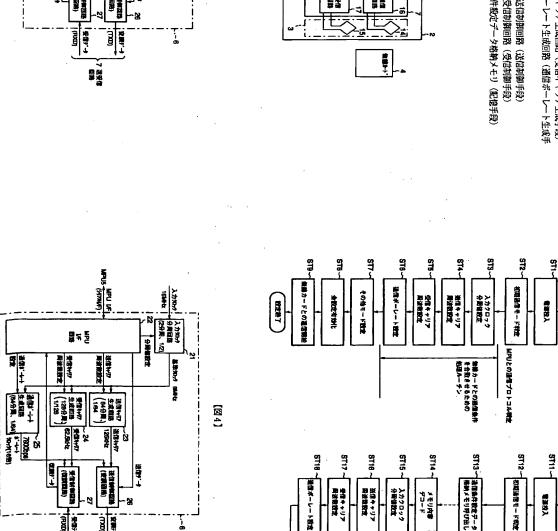
その後モード的な

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MPUS (HPS)

用油物控定 海線を17

生成品牌~23

調料を

7

(DOCH)

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関係の

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人力加力 基準加分 分周回路

[図2]

会理機能を



(13)

<u> </u>		MPU MPU VF	22 		
		•	(1981, 1/1) 2 940/1882	A DATE OF THE PARTY OF THE PART	
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通信》· + + 生线回路 (120分層、 1/1/28	受信针符 生成回路 (128分期)	进信补77 生成回路 (84分周)		P	(図5)
7800ms 8:4+ 707/(18/8)	受信针的 62.5kHz	125MHz		!	
 	Haring (Architecture)	27 (金剛田島)	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	!	
İ	(BXR)	(0XI)		نـــــ	•
	<u>. </u>	7			

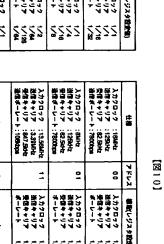
	中一大	A社向け モード2	A社向け モード1	180 14xxx	180 10xxx	中書
	0.4	0.9	02	01	00	アドレス
**********	入力クロック 設合キャンア 安合キャンア ボーレート	入力クロック ※音キャリア 単音キャリア ボーレート	メンクロック 総合やキュア の合やキュア	入力クロック 送信キャリア 受信キャリア サーレート	入力クロック 送信キャリア 受信キャリア デーレーマ	機能(レジスタ数全値)
	2222 2822	2225 2825	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	2222	2223	

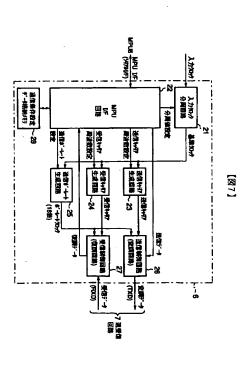
34 §

[図6]

[图9]

 入力クロック :13.56MHz 送信キャリア :3.59MHz 受信キャリア :847,500t 送信ボーレート:106idps	入カクロック : BMPセ 設信キャリア : 12504セ 受信キャリア : 62.504セ 通信ポーレート: 7800bps	入力クロック :18MHz 送信キャリア :125MHz 受信キャリア :02.5MHz 通信ボーレート:7800bps	+
 =	01	00	アドレス
 入力クロック 総合キャリア 現合キャリア オーワート	入分クロック 協会やキリア 収容やキリア	入力クロック 送信キャリア 受信キャリア ポーレート	細胞レジスタ設定値
2222	\$ 18 2 Z	2325 2825	10.25·69)





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入力がか 機様など 分回四年

[28]

물두질

受信+17 受信+17 受信+17 等信申17 生成目的 24

[図12]

(a) 事データ
(b) 同期キャラクタ1バイトの場合
(c) 同期キャラクタ2バイトの場合
(d) CRCデータ付加の場合
(e) 同時フレーム(SOF)/(終アフレーム(EOF)付加の場合
(f) 同時フレーム(SOF)/(終アフレーム(EOF)付加の場合
(g) 終アフレーム(EOF)付加の場合
(h) 反応 (Data 2) (Data 3) (EOF)

デマンド (参考)

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F 夕一人(参考) 58014 ENO1 CNO5 CN33 58058 CA15 CA22 KA40 580604 AA01 BA12 8002 58034 AA19 AA20 DD01 EE03 FF01 CAD2 IIIO1 IIIO2 IIIO4 IIIG3 KKO2 MAD8

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